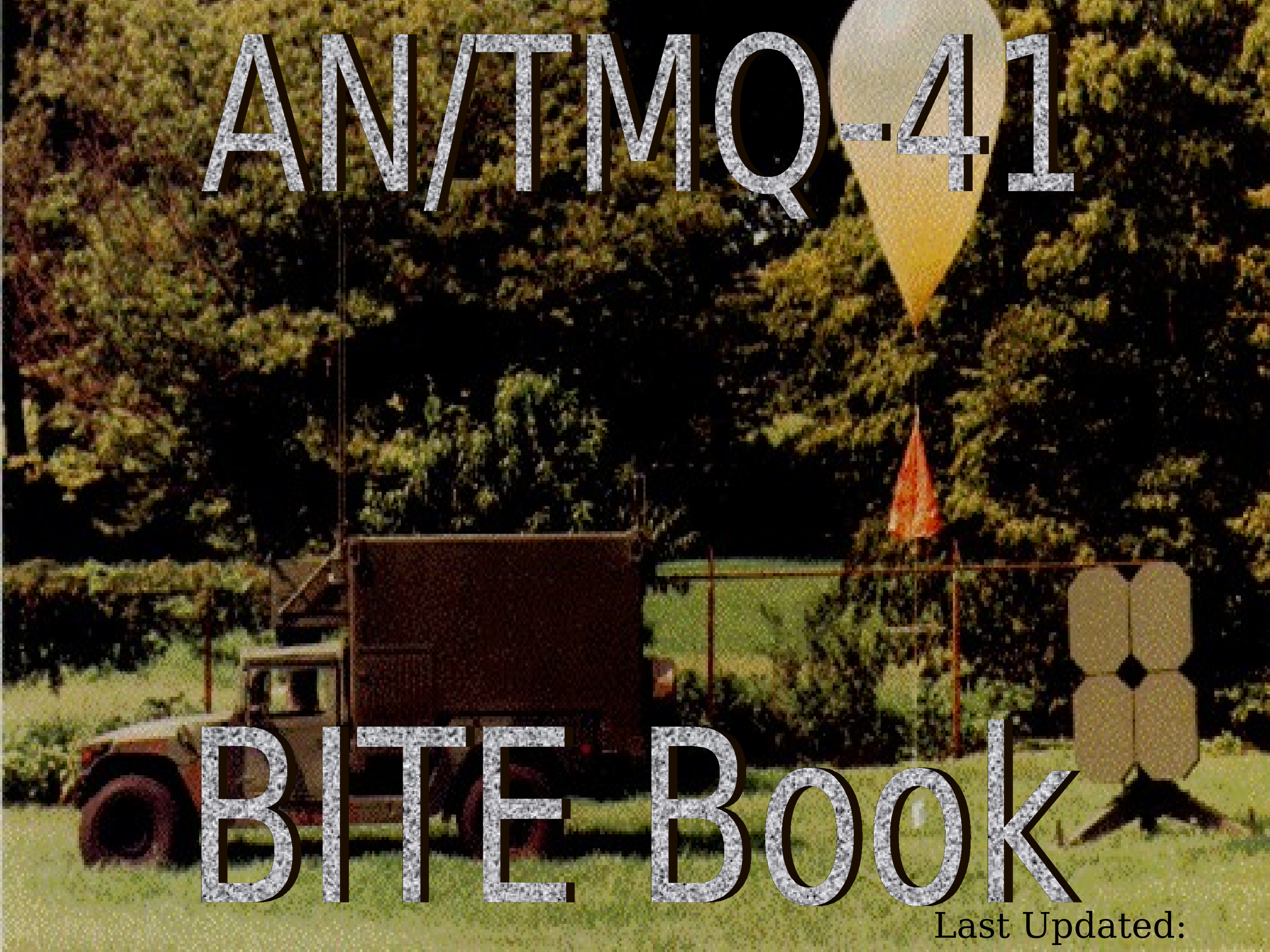

AN/TMQ-41

BITE Book

Last Updated:

AN/TMQ-41 Bitebook

The notes, diagrams, and procedures in this bitebook are an accumulation of information from the Marine Artillery Electronic Maintenance Course (MAEMC) and the information provided to us by the Fleet Marine Force. They stem from lessons learned at the schoolhouse as well as from operating forces. This information will undoubtedly change and evolve in the future as new information is discovered about the Met system. If there are any correction, changes or add on of information, please don’t hesitate to get in touch with us so we can further the progress of this book. This book should be used as a reference source and not a bible. It should be stressed that this is not to replace any of the technical manuals but to aid in there use. Also note that all safety cautions listed in the TM’s should be followed while performing any electronic maintenance on the system.

Semper-Fi
SSgt Wallace

TABLE OF CONTENTS

OPERATIONAL CHECKLIST 1

Marwin & Switching unit/Amplifier cable connection layout (Figures #1,2) 3

MMS block diagram 5

MARWIN block diagram 6

Marwin card location and identification 7

Marwin troubleshooting flowcharts 24

Power Control Unit component location and identification 44

Power Control Unit troubleshooting flowcharts 45

Power Entry Assembly 54

Power Entry Assembly troubleshooting flowcharts 55

Signal Entry Box 58

Signal Entry Box troubleshooting flowcharts 59

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Operational Checklist

This checklist can be used as a guide when starting the AN/TMQ-41 Met system from a cold start. The procedures are extracts from various technical manuals (TM’s). This list is intended to aid in confirming whether a system is fully operational or to help you locate a fault.

Visual Inspection:

1. Check all external power cables for proper connection. Ensure the vehicle battery slave adapter is connected for vehicle power.

2. Check grounding rod for depth and grounding strap for connection.

3. Check all antennas and antenna cables for proper connection.

4. Check for damage to outside of MET system.

Verify System Input AC Power:

5. Turn on power source (generator/ house power) if source has a voltage adjustment, insure proper output.

6. Turn on the *AC POWER* Circuit Breaker and the *DC POWER* Circuit Breaker on the Power Entry Unit.

7. Turn on the *ECU POWER* Circuit Breaker if needed.

8. Verify the AC power in the MET shelter by viewing the *VAC INOUT METER.* It should read in between 116 – 118 V AC.

9. Turn on the *DC POWER* Circuit Breaker on the Power Control Unit. Verify the VDC meter reads 26 – 28 V DC. Once the DC Power CB is turned on, you should hear the Elapsed timer cycling (Clicking sound). Ensure the VDC meter selector switch is in the *VEHICLE* position (NOTE that the meter will read 24V in both settings on the switch).

Begin Applying Power to System:

10. With the *DC Power* Circuit breaker on you should see the green STD BY LED on the Marwin.

11. Turn on the *AC Power* Circuit Breaker. You should hear the PS1 blower in the Power Control Unit turn on. You should see the green STD BY LED on the Marwin and the red CHARGE LED on the printer turn on. you should hear the Elapsed timer cycling (Clicking sound).

12. Turn on the *LIGHTS* Circuit Breaker. If you have the door closed, the lights should come on. If the door is open, pull the Blackout

Operational Checklist

Perform diagnostic tests of the MET system.

15. Verify the proper cable connections on the Marwin (see figure #1). Press the *ON* Button on the Marwin to start the Marwin.

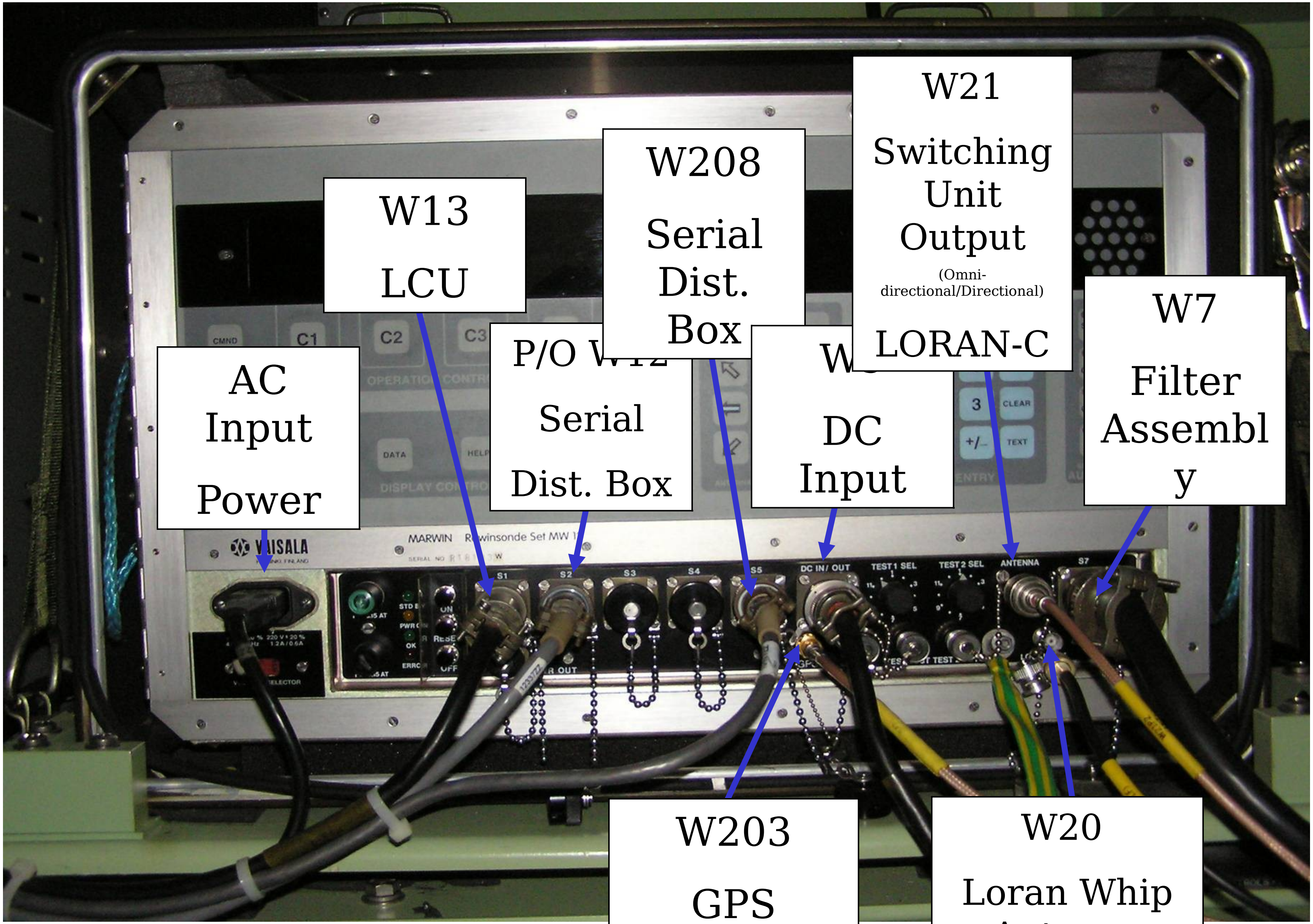
The Marwin will go through a self-test, once it is complete it should go to SELECT OPERATION screen.

16. Verify there is not a hard drive located in the LCU. Turn on the LCU and verify that power is getting to the LCU. Shut down the LCU.

17. Verify the printer is on SERIAL (Will not work in parallel). Turn on the printer and verify power to the printer. Shut off the printer.

18. Turn on the radios and verify the input power to the radios. Shut off the radios. (Note: you must first turn on the amplifier under the shelf, then the radio mount and finally the radios themselves).

MARWIN cable connection layout


CMND
C1
C2
C3
DATA
VAISALA
MARWIN
S1
S2
S3
S4
S5
DC IN/ OUT
TEST 1 SEL
TEST 2 SEL
ANTENNA
S7
3
CLEAR
+/–
TEXT

W13

LCU

AC
Input

Power

P/O W12

Serial

Dist. Box

W208

Serial
Dist.
Box

W

DC
Input

W21

Switching
Unit
Output

(Omni-directional/Directional)

LORAN-C

W7

Filter
Assembly

W203

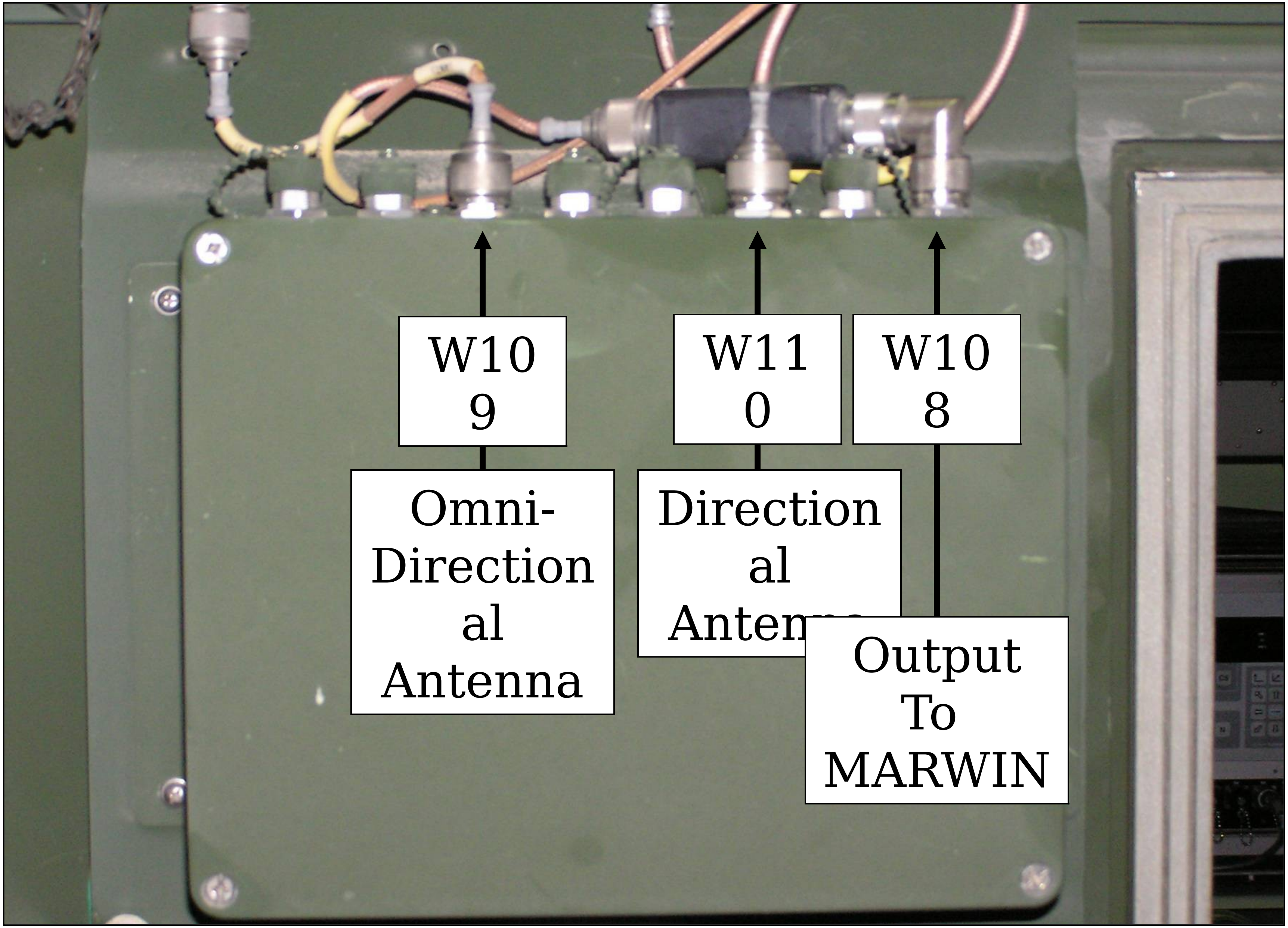
GPS
Antenna

W20

Loran Whip
Antenna

Figure #1

Switch box/Amplifier cable connection layout



W109

Omni-Directional Antenna

W110

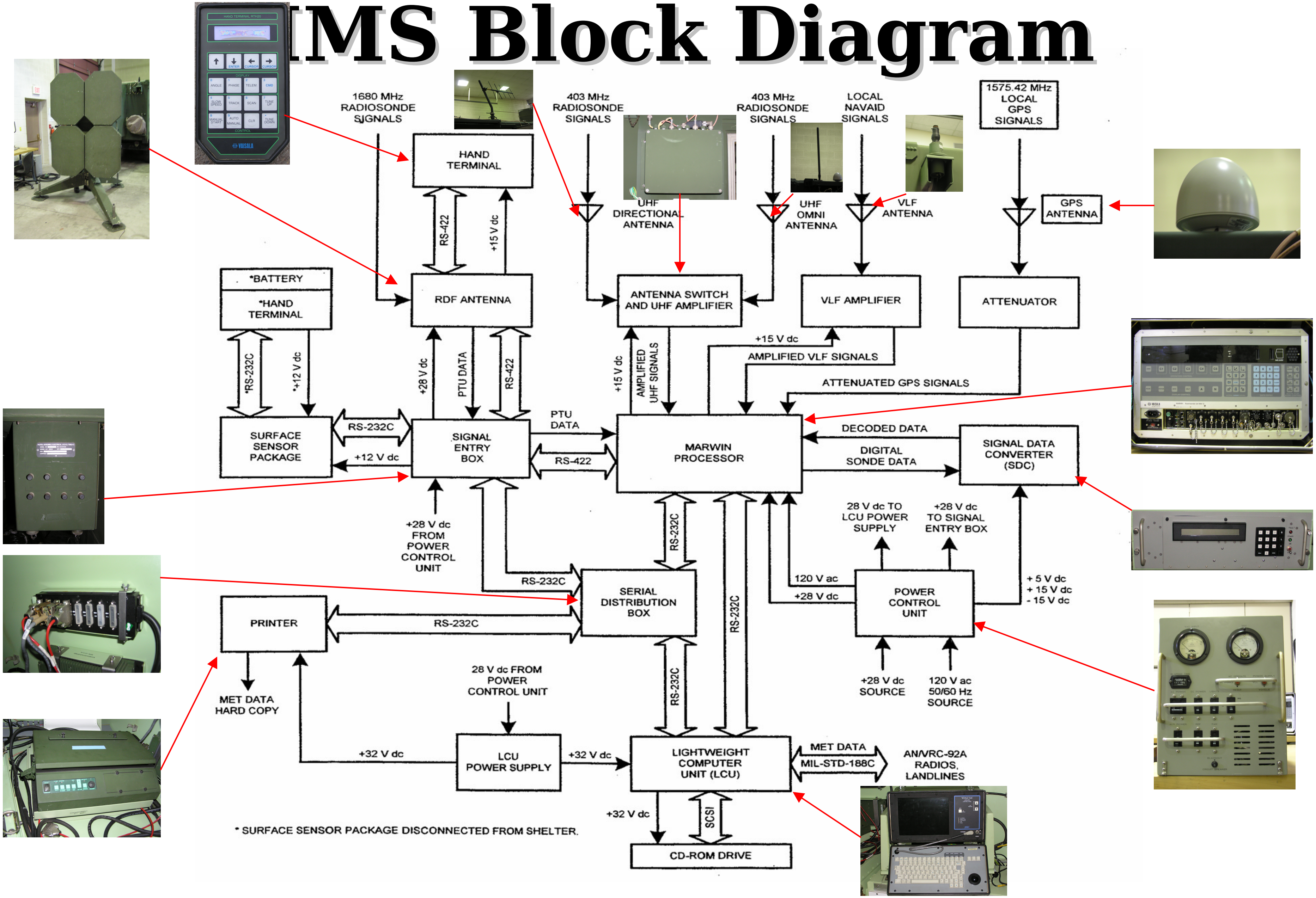
Directional Antenna

W108

Output To MARWIN

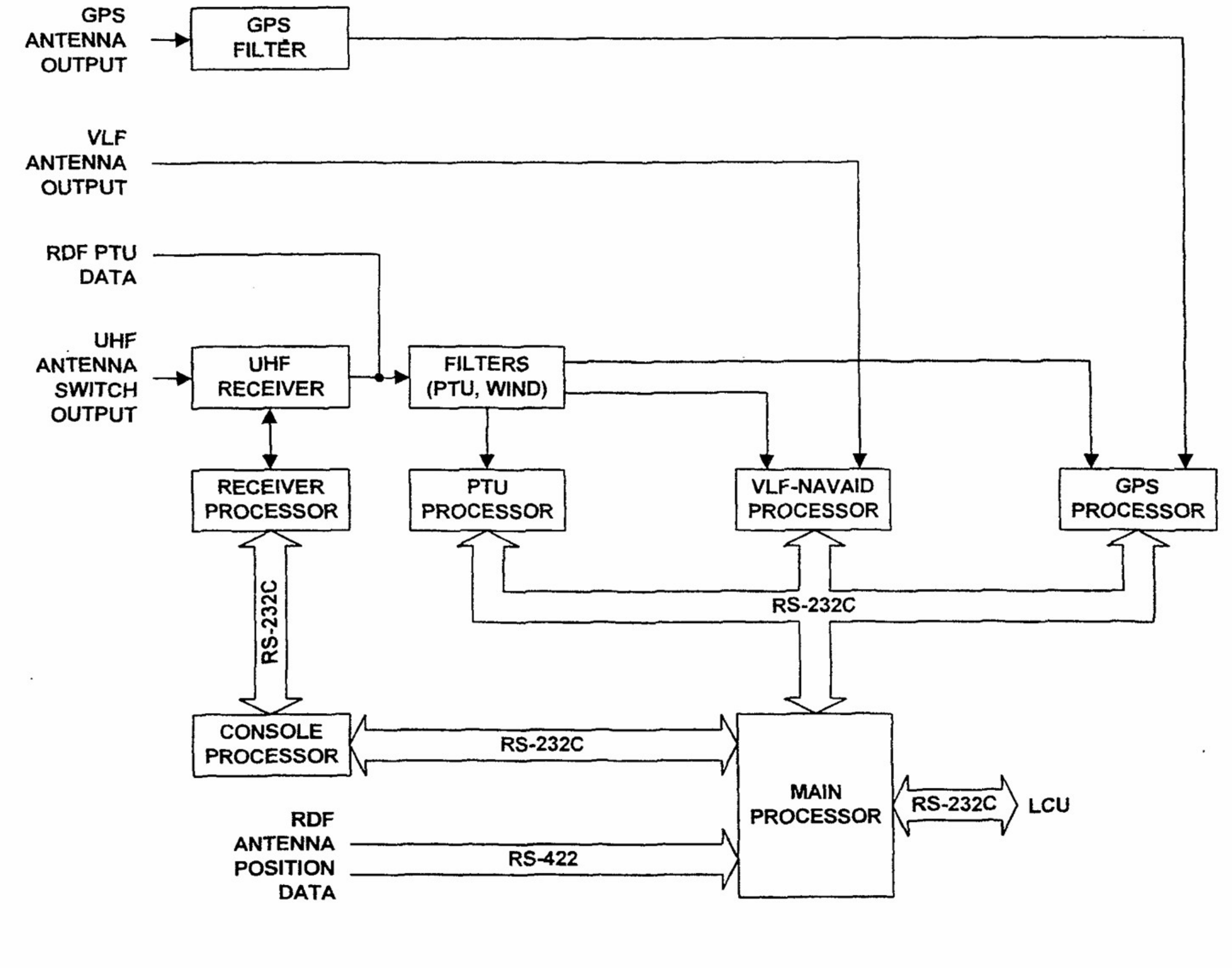
Figure #2

IMS Block Diagram


1680 MHz RADIOSONDE SIGNALS
HAND TERMINAL
RS-422
+15 V dc
403 MHz RADIOSONDE SIGNALS
UHF DIRECTIONAL ANTENNA
403 MHz RADIOSONDE SIGNALS
UHF OMNI ANTENNA
LOCAL NAVAID SIGNALS
VLF ANTENNA
1575.42 MHz LOCAL GPS SIGNALS
GPS ANTENNA
*BATTERY
*HAND TERMINAL
RDF ANTENNA
ANTENNA SWITCH AND UHF AMPLIFIER
VLF AMPLIFIER
ATTENUATOR
*RS-232C
*+12 V dc
+28 V dc
PTU DATA
RS-422
+15 V dc
AMPLIFIED UHF SIGNALS
+15 V dc
AMPLIFIED VLF SIGNALS
ATTENUATED GPS SIGNALS
SURFACE SENSOR PACKAGE
RS-232C
+12 V dc
SIGNAL ENTRY BOX
PTU DATA
RS-422
MARWIN PROCESSOR
DECODED DATA
DIGITAL SONDE DATA
SIGNAL DATA CONVERTER (SDC)
+28 V dc FROM POWER CONTROL UNIT
RS-232C
RS-232C
RS-232C
28 V dc TO LCU POWER SUPPLY
+28 V dc TO SIGNAL ENTRY BOX
120 V ac
+28 V dc
POWER CONTROL UNIT
+ 5 V dc
+ 15 V dc
- 15 V dc
SERIAL DISTRIBUTION BOX
PRINTER
RS-232C
MET DATA HARD COPY
28 V dc FROM POWER CONTROL UNIT
+28 V dc SOURCE
120 V ac 50/60 Hz SOURCE
RS-232C
+32 V dc
LCU POWER SUPPLY
+32 V dc
LIGHTWEIGHT COMPUTER UNIT (LCU)
MET DATA
MIL-STD-188C
AN/VRC-92A RADIOS, LANDLINES
+32 V dc
SCSI
CD-ROM DRIVE

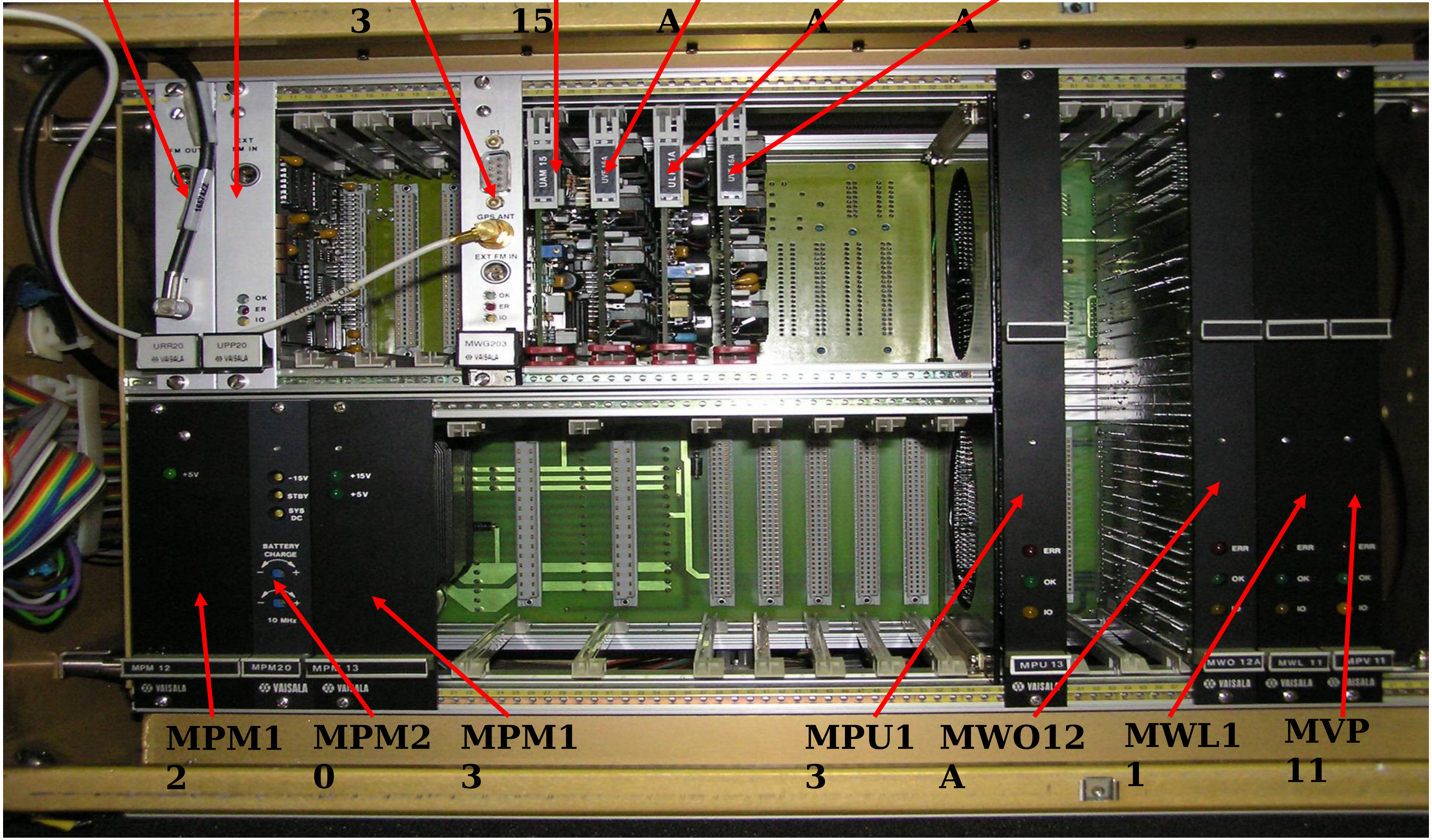
* SURFACE SENSOR PACKAGE DISCONNECTED FROM SHELTER.

MARWIN Block Diagram


GPS ANTENNA OUTPUT
GPS FILTER
VLF ANTENNA OUTPUT
RDF PTU DATA
UHF ANTENNA SWITCH OUTPUT
UHF RECEIVER
FILTERS (PTU, WIND)
RECEIVER PROCESSOR
PTU PROCESSOR
VLF-NAVAID PROCESSOR
GPS PROCESSOR
RS-232C
RS-232C
CONSOLE PROCESSOR
RS-232C
MAIN PROCESSOR
RS-232C
LCU
RDF ANTENNA POSITION DATA
RS-422

MARWIN PROCESSOR (AN/UMQ-16A) BLOCK DIAGRAM FOR AN/TMQ-41A

MARWIN card location & Identification


FM OUT
EXT FM IN
OK
ER
IO
URR20
UPP20
VAISALA
P1
GPS ANT
EXT FM IN
MWG203
UAM 15
UVF16A
ULF11A
+5V
-15V
STBY
SYS DC
BATTERY CHARGE
10 MHz
+15V
ERR
MPM 12
MPM20
MPM 13
MPU 13
MWO 12A
MWL 11
MPV 11

URR20

UPP20

MWG203

UAM15

UVF16A

ULF11A

UVF16A

MPM12

MPM20

MPM13

MPU13

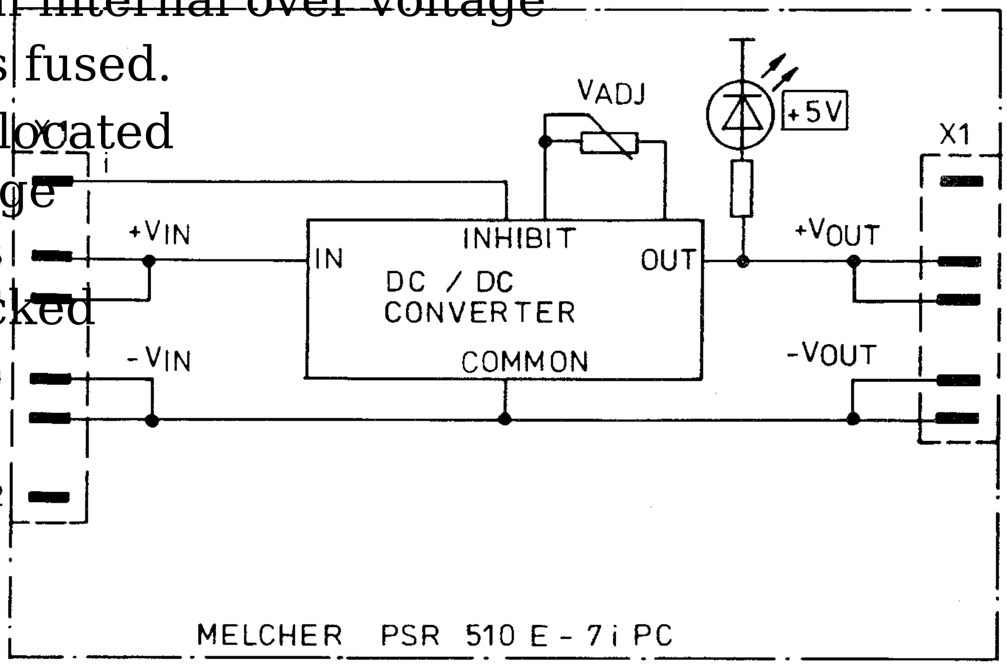
MWO12A

MWL11

MVP11

MPM12 Power Unit +5V

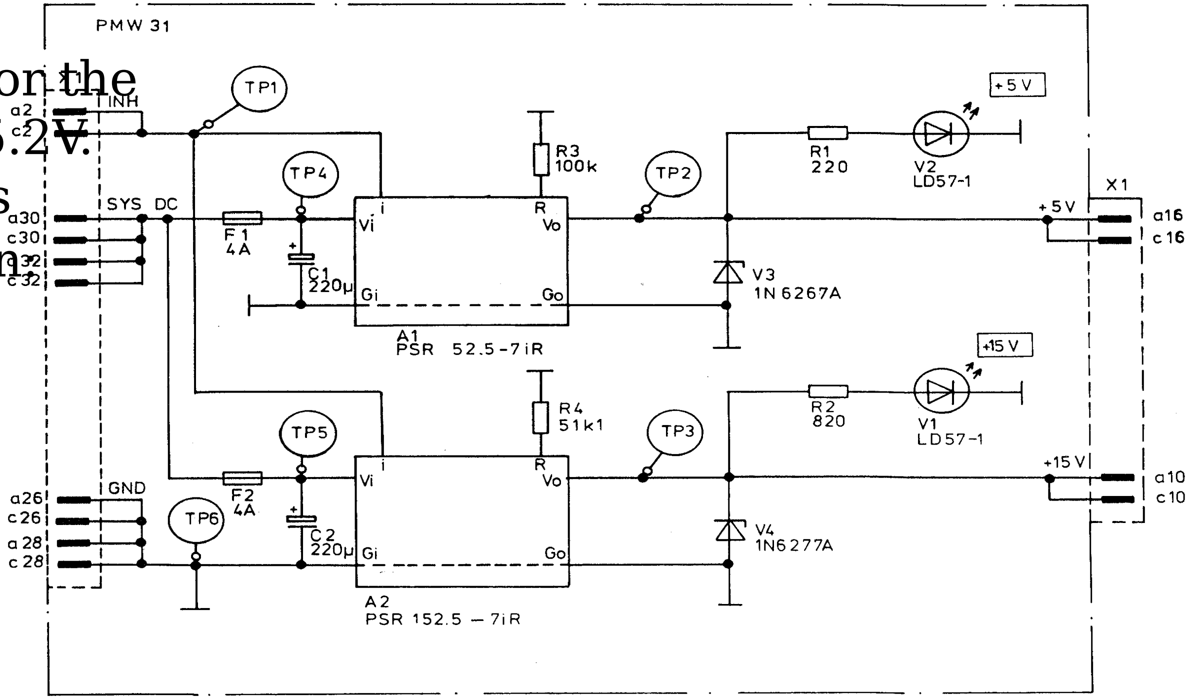
- The MPM12 power unit is a +5V power supply that is powered by the system voltage.
- Maximum load is 10A.
- The nominal output voltage is adjusted at the factory for 5.2V
- The unit is also provided with internal over voltage protection. The input power is fused.
- A trimmer potentiometer is located under the front cover for voltage adjustments.
- Output voltages can be checked on the motherboard.
- Also known as a DC/DC converter.


VADJ
+5V
X1
5
2
+VIN
INHIBIT
26
IN
OUT
+VOUT
14
DC / DC
CONVERTER
29
17
-VIN
-VOUT
20
COMMON
8
23
11
32
MELCHER PSR 510 E - 7 i PC

MPM13 Power Unit +15V & +5V

- The MPM13 power unit is a +15V & +5V power supply that is powered by the system voltage.

- The output voltage for the +15V is set by R4 to +15V. Zener diode V4 acts as over voltage protection: in case the output voltage rises above +18V, current is passed through Z4 to ground and Fuse F2 is blown.
- The output voltage for the +5V is set by R3 at +5.2V. Zener diode V3 acts as over voltage protection: in case the output voltage rises above +7.5V, current is passed through Z4 to ground and Fuse F1 is blown.
- Also known as a DC/DC converter.


PMW 31
TP1
INH
a2
c2
+5 V
R3
100k
TP4
TP2
R1
220
V2
LD57-1
X1
SYS DC
a30
c30
a32
c32
F1
4A
C1
220µ
Vi
i
R
Vo
Gi
Go
+5 V
a16
c16
V3
1N6267A
A1
PSR 52.5-7iR
+15 V
R4
51k1
TP5
TP3
R2
820
V1
LD57-1
+15 V
a10
c10
GND
a26
c26
a 28
c 28
TP6
F2
4A
C2
220µ
Vi
i
R
Vo
Gi
Go
V4
1N6277A
A2
PSR 152.5 — 7iR

MPM20 Power Unit -15V & Oscillator

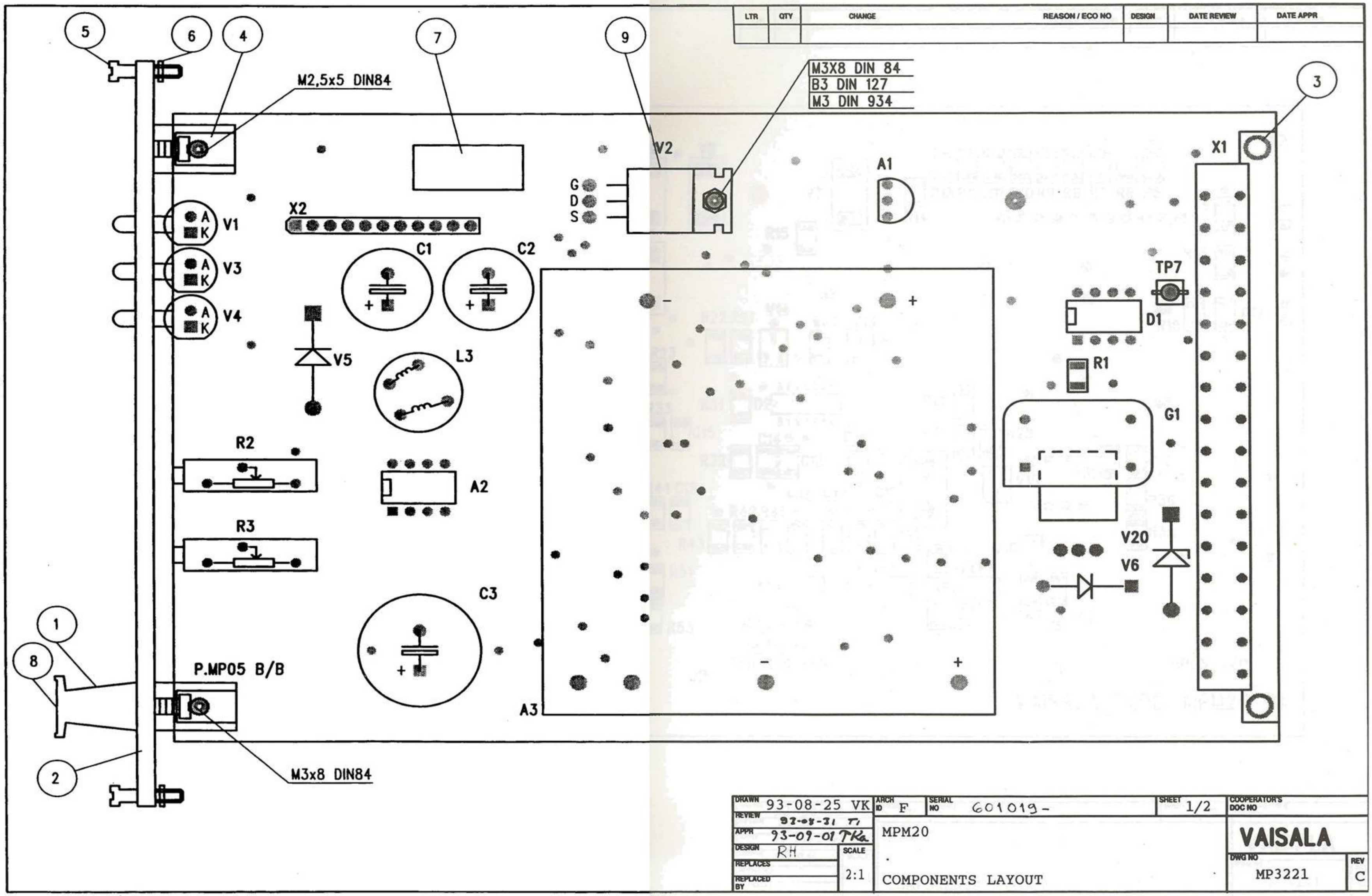
- The MPM20 consists of the following functional parts:
  - DC/DC converter for Standby state supply voltage
  - Low voltage detector for raw input voltage
  - Switch for over temperature
  - ON/OFF control logic for DC/DC converters
  - Battery charger
  - 10MHZ reference frequency oscillator

MPM20 Power Unit (Continued)

- Standby voltage regulator
  - Voltage regulator -15V STANDBY is a DC/DC converter which gets it’s input power from raw voltage (SYSDC). LED STBDC (V3) on the front panel indicates functionality of the DC/DC converter.
- Detector for low input voltage (SYSDC)
  - The combination of the voltage regulator A6 and the comparator A7 detects low voltage. Resisters R46, R47 and R39 set the operating point of the detector. Nominal point for cutoff is approx. 15.5V and after reconnect, approx. 16.5V.
- On/Off control of DC/DC converters
  - Controls the state of the DC/DC converters (MPM12 and MPM13)
- Over-temperature switch
  - At 167° F, the DC/DC converters (MPM12 and MPM 13) will be shut off regardless of the commanded state.

MPM20 Power Unit (Continued)

- Control of battery relay
  - Transistor V11 switches the relay off when the raw voltage (SYSDC) is below the shutdown limit.
- -15V voltage
  - The -15V power is provided by the input voltage of +15V. LED V1 on the front panel indicates the presence of -15V.
- -5V voltage
  - The -5V power is provided by the input voltage of -15V.
- Master Oscillator
  - Oscillator G1 is a OCXO type (Oven Controlled Xtal Oscillator).
  - It’s a small, 10MHZ precision oscillator.
  - Trimmer potentiometer R3 adjusts the frequency of oscillator G1.


5
6
4
7
9
3
M2,5x5 DIN84
M3X8 DIN 84
B3 DIN 127
M3 DIN 934
V2
G
D
S
A1
X1
X2
V1
V3
V4
A
K
C1
C2
TP7
D1
V5
L3
R1
G1
R2
A2
R3
V20
V6
C3
1
8
P.MP05 B/B
A3
2
M3x8 DIN84
+
-

LTR	QTY	CHANGE	REASON / ECO NO	DESIGN	DATE REVIEW	DATE APPR

DRAWN 93-08-25 VK	ARCH ID F	SERIAL NO 601019-	SHEET 1/2
REVIEW 93-08-31 TI	MPM20		COOPERATOR'S DOC NO
APPR 93-09-01 TKa			VAISALA
DESIGN RH	SCALE 2:1		
REPLACES	COMPONENTS LAYOUT		DWG NO MP3221
REPLACED BY			REV C

URR20 Receiver unit

- The URR20 is a radiosonde receiver operating at 400…406 MHZ.
- The UPP20 Receiver Processor controls the functions of the URR20 which receives radiosonde signals from the directional UHF antenna and the omni-directional UHF antenna.
- The URR20 is a six layer board.
- Schematics are located in the TM 10103A-23/4-3

UPP20 Processor unit

o The UPP20 Receiver Processor controls the functions of the URR20 which receives radiosonde signals from the directional UHF antenna and the omni-directional UHF antenna.

o In addition to controlling the URR20, it include capabilities of measuring the radiosonde and special sensor signals. It also has a provision for receiving signals from future digital radiosonde.

o Schematics are located in the TM 10103A-23/4-3

UAM15 Audio monitor unit

o The UAM15 Audio Monitor is the audio unit of the radiosonde receiver in which the PTU (Pressure, Temp and Humidity) and VLF signals of the 7 to 13 KHZ radiosonde are converted to approx. 1 to 2 KHZ to improve audibility.

o Monitors frequencies PTU, Omega (not used) or Loran-C.

o Schematics are located in the TM 10103A-23/4-3

UVF16A VLF filter unit

o The UVF16A is a signal conditioner that converts input analog signals into TTL (transistor to transistor logic) level digital signals for phase measurements.

o Filters separate the specific frequencies.

o Transistors provide some 4 dB voltage attenuation.

o Capacitors tune all frequencies to the same center frequency.

o Amplifiers are used to provide a uniform gain on all channels.

o Comparators clip the signals and make a TTL level square wave.

o There are two UVF16A cards located in the Marwin. One is for local Loran-C stations and the other is for remote Loran-C stations.

o Schematics are located in the TM 10103A-23/4-3

MWO12A VLF correlator unit

- The MWO12A is designed for phase measurement of VLF navigation signals.
- It handles both Local and Remote channels.
- The card comprises the control and arithmetic processors, generators for reference frequencies and a correlator.
- Schematics are located in the TM 10103A-23/4-3

ULF11 Loran-C filter unit

- The ULF11 is a band-pass filter picking up 100 KHZ Loran-C radio navigation pulses.
- It provides Automatic Gain Control functions.
- A selective amplifier enables the search of interfering signals for analysis.
- Four filter circuits are included for interference elimination, one with provision for manual tuning.
- Schematics are located in the TM 10103A-23/4-3

MPV11 Multichannel VLF filter unit

- The MPV11 is used for the VLF signal processing.
- Contains a 6 channel VLF filter.
- Also contains a signal multiplying section.
- Schematics are located in the TM 10103A-23/4-3

MWL11 Loran-C processor unit

o Loran pulses are brought to the Loran-C processor via the ULF11 Loran-C filter. The MWL11 controls the main functions of the ULF11 such as amplification, local/remote channel selection and tuning of the filters.

o The processor receives a 10 MHZ reference clock frequency from a high-accuracy oscillator.

o Schematics are located in the TM 10103A-23/4-3

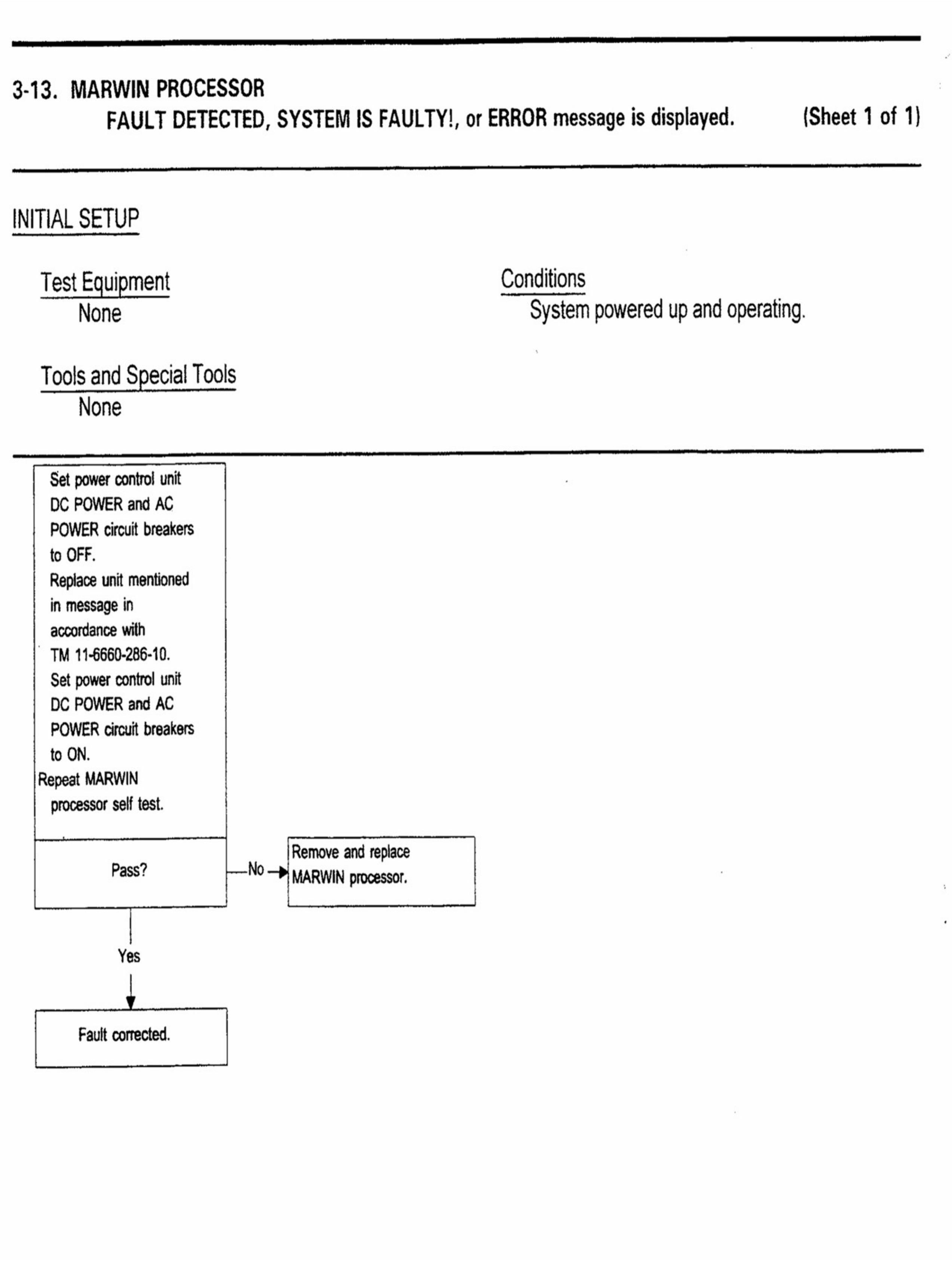
MPU13 Main processor unit

- The MPU13 serves as the central processor for the radiosonde data receiving systems.
- In addition to the normal processor functions, the CPU comprises the following peripheral functions:
  - Interrupt controller.
  - Generation of chip selection signals.
  - Timer/counter unit.
  - Dynamic memory refresh controller.
- Schematics are located in the TM 10103A-23/4-3

MWG203 (GPS) unit

- This card is used for Global Positioning Systems operations.
- We do not have any information on this card yet due to it being new to the MMS.

MARWIN troubleshooting flowchart



3-13. MARWIN PROCESSOR
FAULT DETECTED, SYSTEM IS FAULTY!, or ERROR message is displayed. (Sheet 1 of 1)

INITIAL SETUP

Test Equipment
None

Tools and Special Tools
None

Conditions
System powered up and operating.

Set power control unit DC POWER and AC POWER circuit breakers to OFF.
Replace unit mentioned in message in accordance with TM 11-6660-286-10.
Set power control unit DC POWER and AC POWER circuit breakers to ON.
Repeat MARWIN processor self test.

Pass?

No → Remove and replace MARWIN processor.

Yes → Fault corrected.

MARWIN troubleshooting flowchart

3-14. MARWIN PROCESSOR

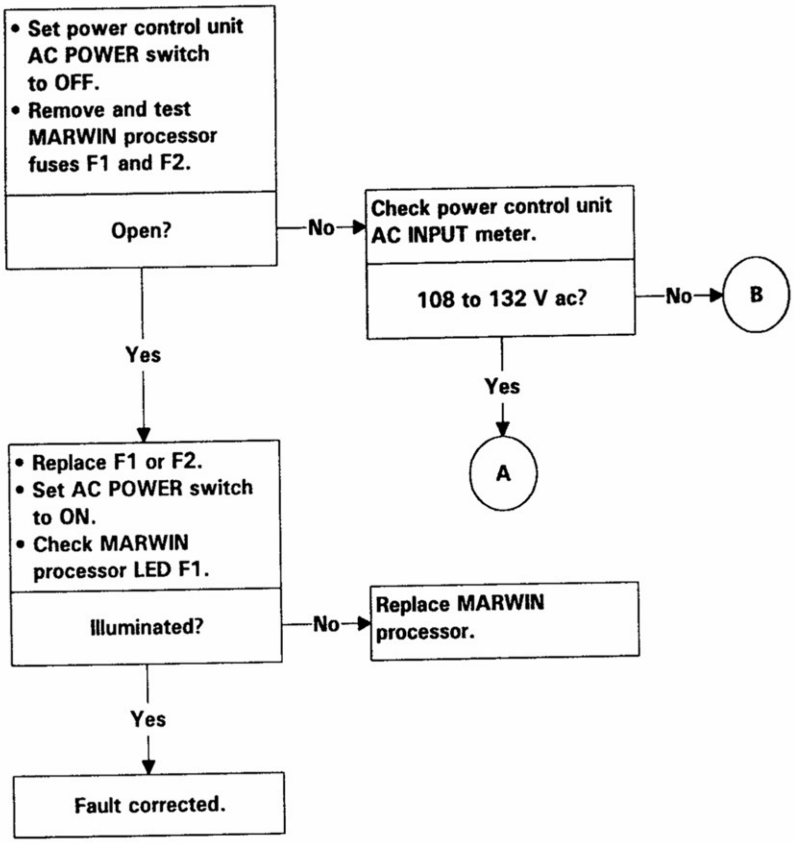
F1 LED does not illuminate when AC power is applied. (Sheet 1 of 3)

INITIAL SETUP

Test Equipment
None

Tools and Special Tools
None

Conditions
Verified 240 V ac connected to power entry assembly 1J1.



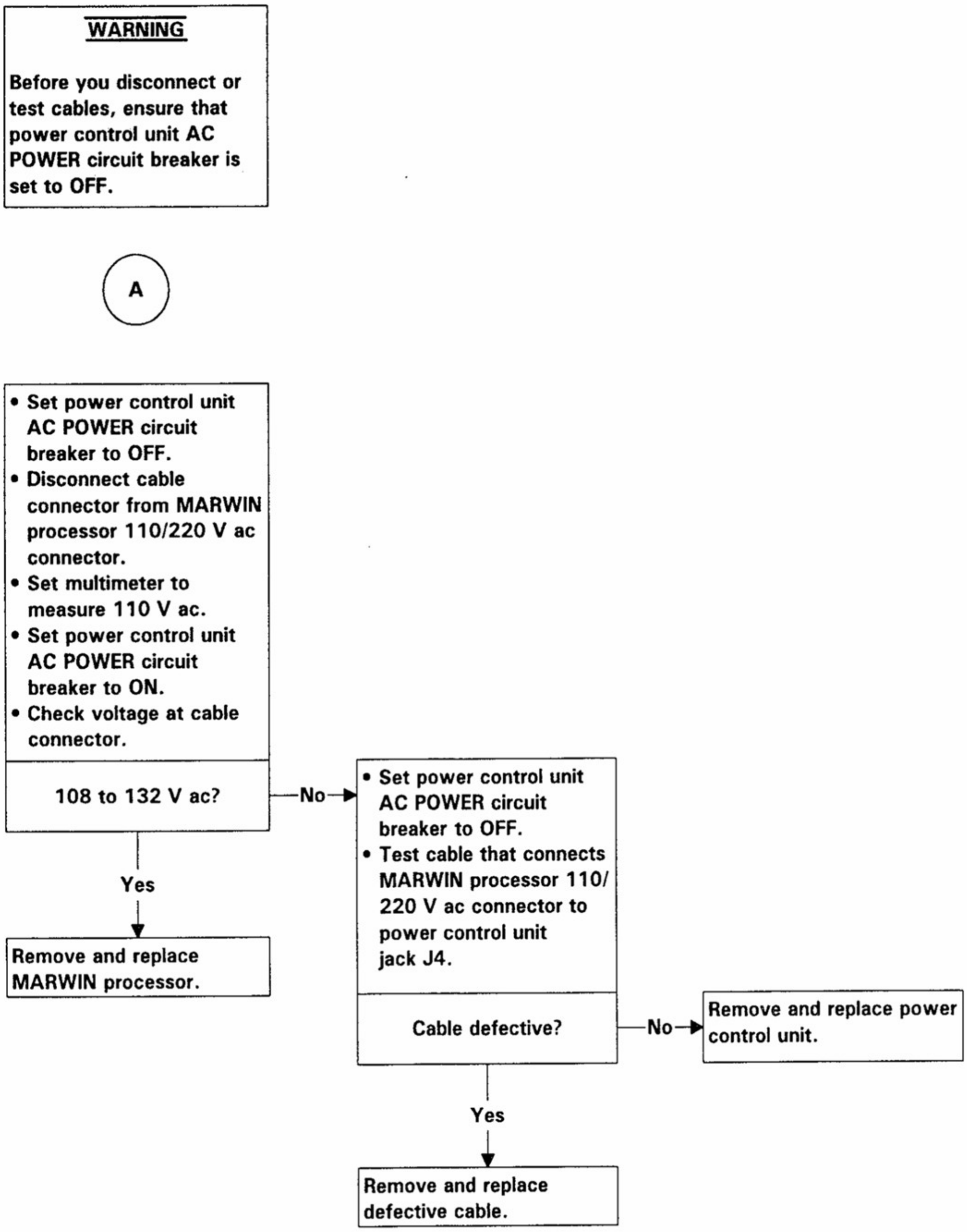
• Set power control unit AC POWER switch to OFF.
• Remove and test MARWIN processor fuses F1 and F2.
Open?
No
Check power control unit AC INPUT meter.
108 to 132 V ac?
No
B
Yes
A
Yes
• Replace F1 or F2.
• Set AC POWER switch to ON.
• Check MARWIN processor LED F1.
Illuminated?
No
Replace MARWIN processor.
Yes
Fault corrected.

MARWIN troubleshooting flowchart

3-14. MARWIN PROCESSOR

F1 LED does not illuminate when AC power is applied.

(Sheet 2 of 3)



WARNING

Before you disconnect or test cables, ensure that power control unit AC POWER circuit breaker is set to OFF.

- Set power control unit AC POWER circuit breaker to OFF.
- Disconnect cable connector from MARWIN processor 110/220 V ac connector.
- Set multimeter to measure 110 V ac.
- Set power control unit AC POWER circuit breaker to ON.
- Check voltage at cable connector.

108 to 132 V ac?

Remove and replace MARWIN processor.

- Set power control unit AC POWER circuit breaker to OFF.
- Test cable that connects MARWIN processor 110/220 V ac connector to power control unit jack J4.

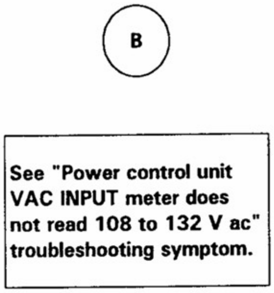
Cable defective?

Remove and replace defective cable.

Remove and replace power control unit.

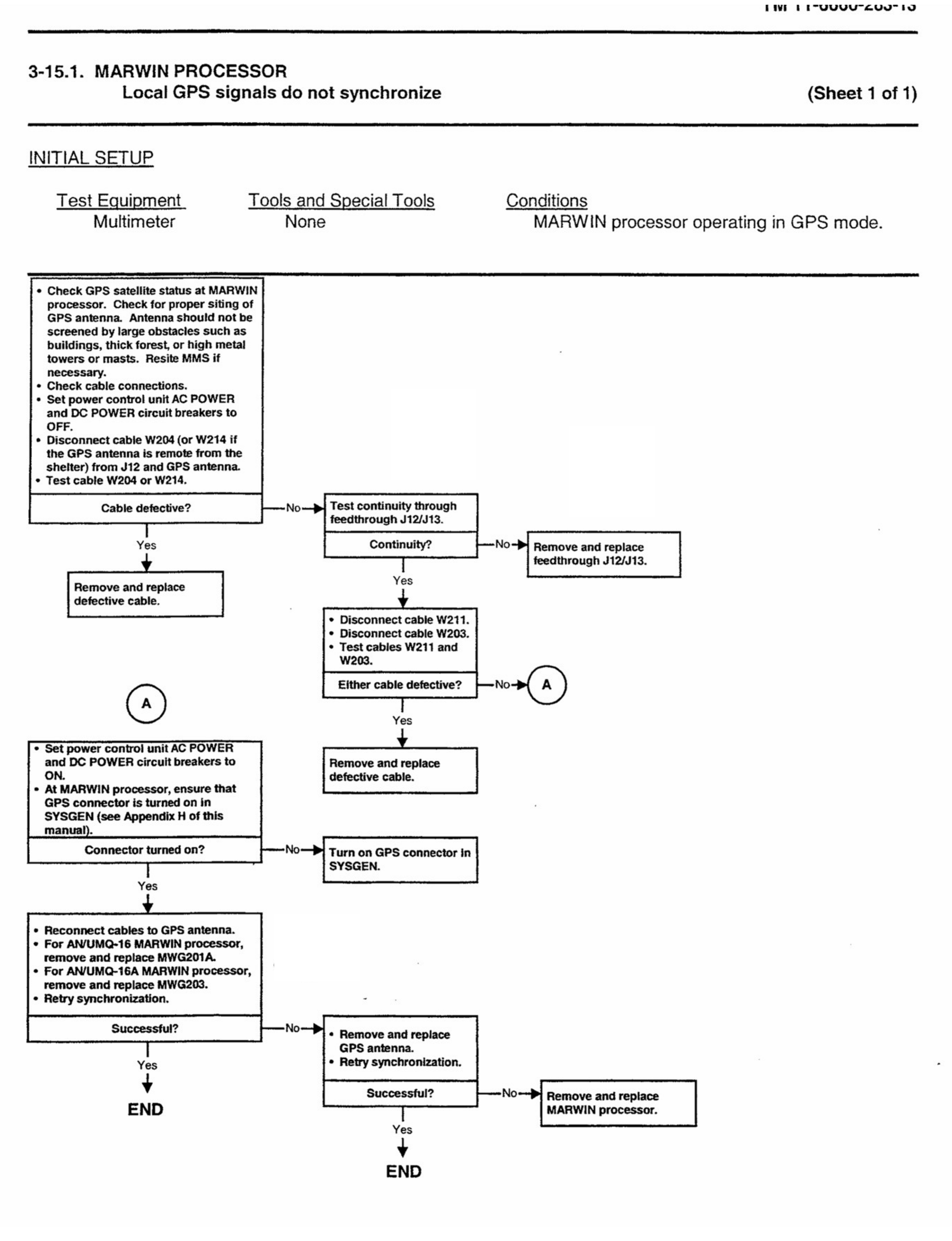
3-14. MARWIN PROCESSOR

F1 LED does not illuminate when AC power is applied. (Sheet 3 of 3)



See "Power control unit VAC INPUT meter does not read 108 to 132 V ac" troubleshooting symptom.

MARWIN troubleshooting flowchart



3-15.1. MARWIN PROCESSOR
Local GPS signals do not synchronize (Sheet 1 of 1)

INITIAL SETUP

Test Equipment	Tools and Special Tools	Conditions
Multimeter	None	MARWIN processor operating in GPS mode.

- Check GPS satellite status at MARWIN processor. Check for proper siting of GPS antenna. Antenna should not be screened by large obstacles such as buildings, thick forest, or high metal towers or masts. Resite MMS if necessary.
- Check cable connections.
- Set power control unit AC POWER and DC POWER circuit breakers to OFF.
- Disconnect cable W204 (or W214 if the GPS antenna is remote from the shelter) from J12 and GPS antenna.
- Test cable W204 or W214.

Cable defective?

Yes: **Remove and replace defective cable.**

No: **Test continuity through feedthrough J12/J13.**

Continuity?

No: **Remove and replace feedthrough J12/J13.**

Yes:

- Disconnect cable W211.
- Disconnect cable W203.
- Test cables W211 and W203.

Either cable defective?

Yes: **Remove and replace defective cable.**

No: A

A

- Set power control unit AC POWER and DC POWER circuit breakers to ON.
- At MARWIN processor, ensure that GPS connector is turned on in SYSGEN (see Appendix H of this manual).

Connector turned on?

No: **Turn on GPS connector in SYSGEN.**

Yes:

- Reconnect cables to GPS antenna.
- For AN/UMQ-16 MARWIN processor, remove and replace MWG201A.
- For AN/UMQ-16A MARWIN processor, remove and replace MWG203.
- Retry synchronization.

Successful?

Yes: END

No:

- Remove and replace GPS antenna.
- Retry synchronization.

Successful?

Yes: END

No: **Remove and replace MARWIN processor.**

MARWIN troubleshooting flowchart

3-16. MARWIN PROCESSOR

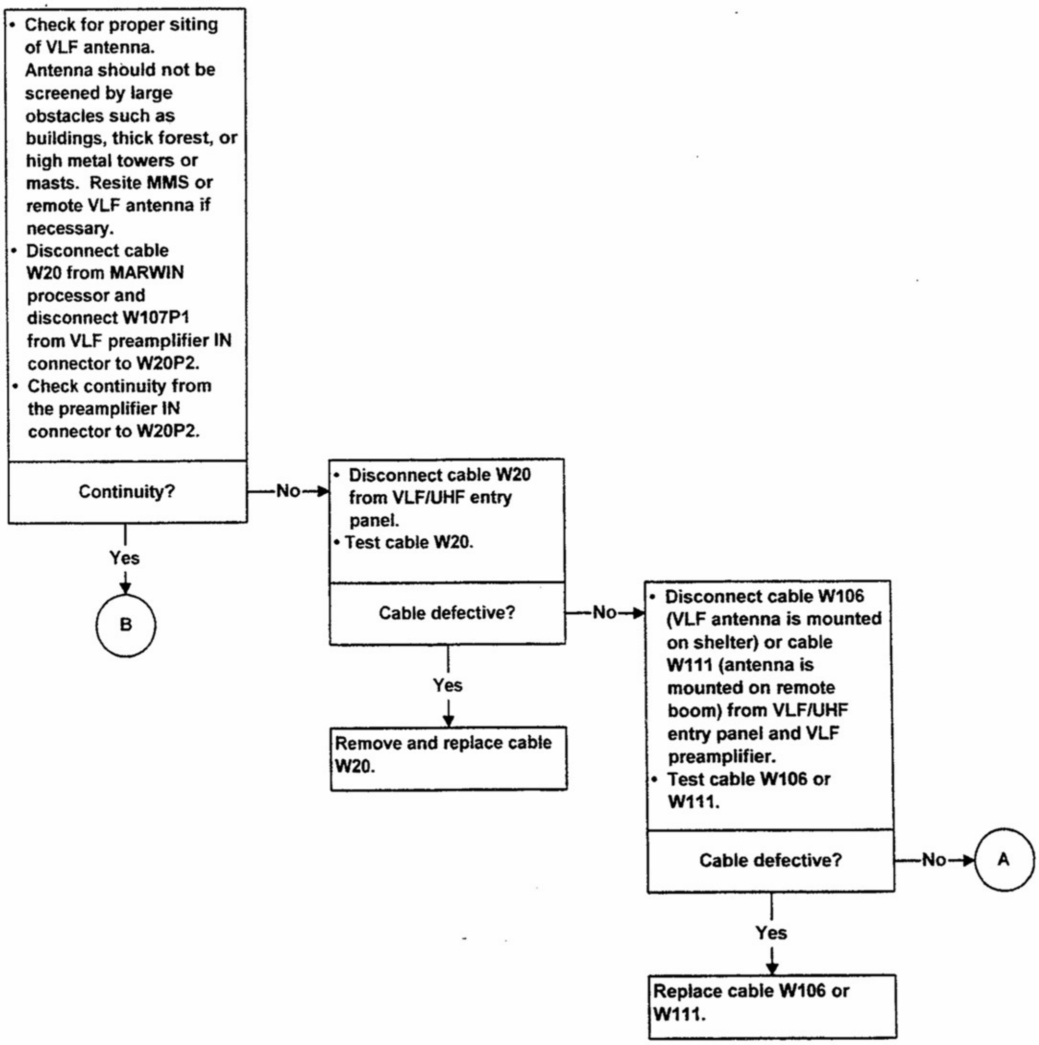
Local NAVAID signals do not synchronize. **(Sheet 1 of 2)**

INITIAL SETUP

Test Equipment
Multimeter

Tools and Special Tools
None

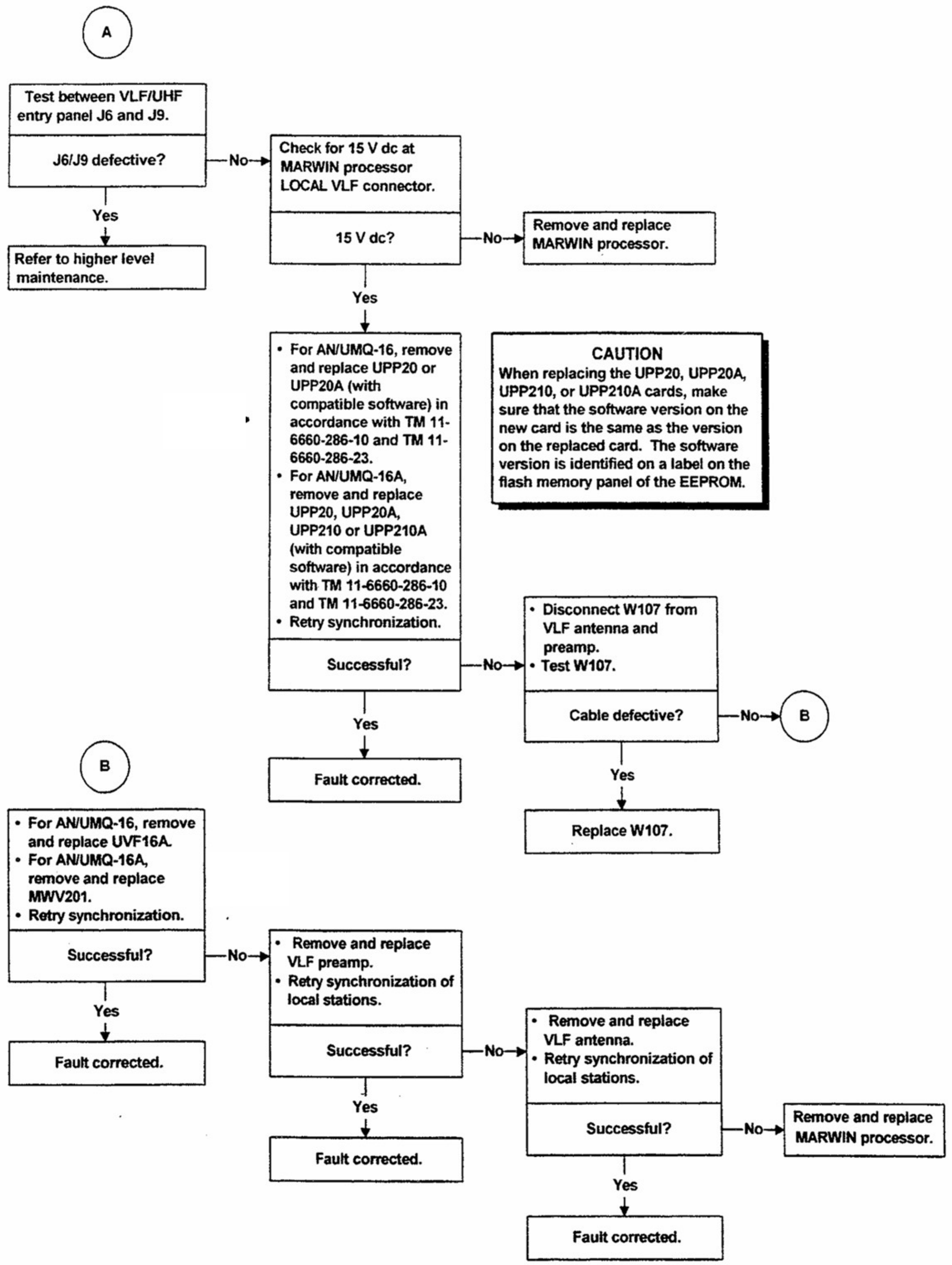
Conditions
MARWIN processor operating in NAVAID mode.


• Check for proper siting of VLF antenna. Antenna should not be screened by large obstacles such as buildings, thick forest, or high metal towers or masts. Resite MMS or remote VLF antenna if necessary.
• Disconnect cable W20 from MARWIN processor and disconnect W107P1 from VLF preamplifier IN connector to W20P2.
• Check continuity from the preamplifier IN connector to W20P2.
Continuity?
Yes
B
No
• Disconnect cable W20 from VLF/UHF entry panel.
• Test cable W20.
Cable defective?
Yes
Remove and replace cable W20.
No
• Disconnect cable W106 (VLF antenna is mounted on shelter) or cable W111 (antenna is mounted on remote boom) from VLF/UHF entry panel and VLF preamplifier.
• Test cable W106 or W111.
Cable defective?
Yes
Replace cable W106 or W111.
No
A

MARWIN troubleshooting flowchart

3-16. MARWIN PROCESSOR

Local NAVAID signals do not synchronize. (Sheet 2 of 2)


A
Test between VLF/UHF entry panel J6 and J9.
J6/J9 defective?
Yes
Refer to higher level maintenance.
No
Check for 15 V dc at MARWIN processor LOCAL VLF connector.
15 V dc?
No
Remove and replace MARWIN processor.
Yes
• For AN/UMQ-16, remove and replace UPP20 or UPP20A (with compatible software) in accordance with TM 11-6660-286-10 and TM 11-6660-286-23.
• For AN/UMQ-16A, remove and replace UPP20, UPP20A, UPP210 or UPP210A (with compatible software) in accordance with TM 11-6660-286-10 and TM 11-6660-286-23.
• Retry synchronization.
Successful?
Yes
Fault corrected.
No
• Disconnect W107 from VLF antenna and preamp.
• Test W107.
Cable defective?
Yes
Replace W107.
No
B
B
• For AN/UMQ-16, remove and replace UVF16A.
• For AN/UMQ-16A, remove and replace MWV201.
• Retry synchronization.
Successful?
Yes
Fault corrected.
No
• Remove and replace VLF preamp.
• Retry synchronization of local stations.
Successful?
Yes
Fault corrected.
No
• Remove and replace VLF antenna.
• Retry synchronization of local stations.
Successful?
Yes
Fault corrected.
No
Remove and replace MARWIN processor.

CAUTION

When replacing the UPP20, UPP20A, UPP210, or UPP210A cards, make sure that the software version on the new card is the same as the version on the replaced card. The software version is identified on a label on the flash memory panel of the EEPROM.

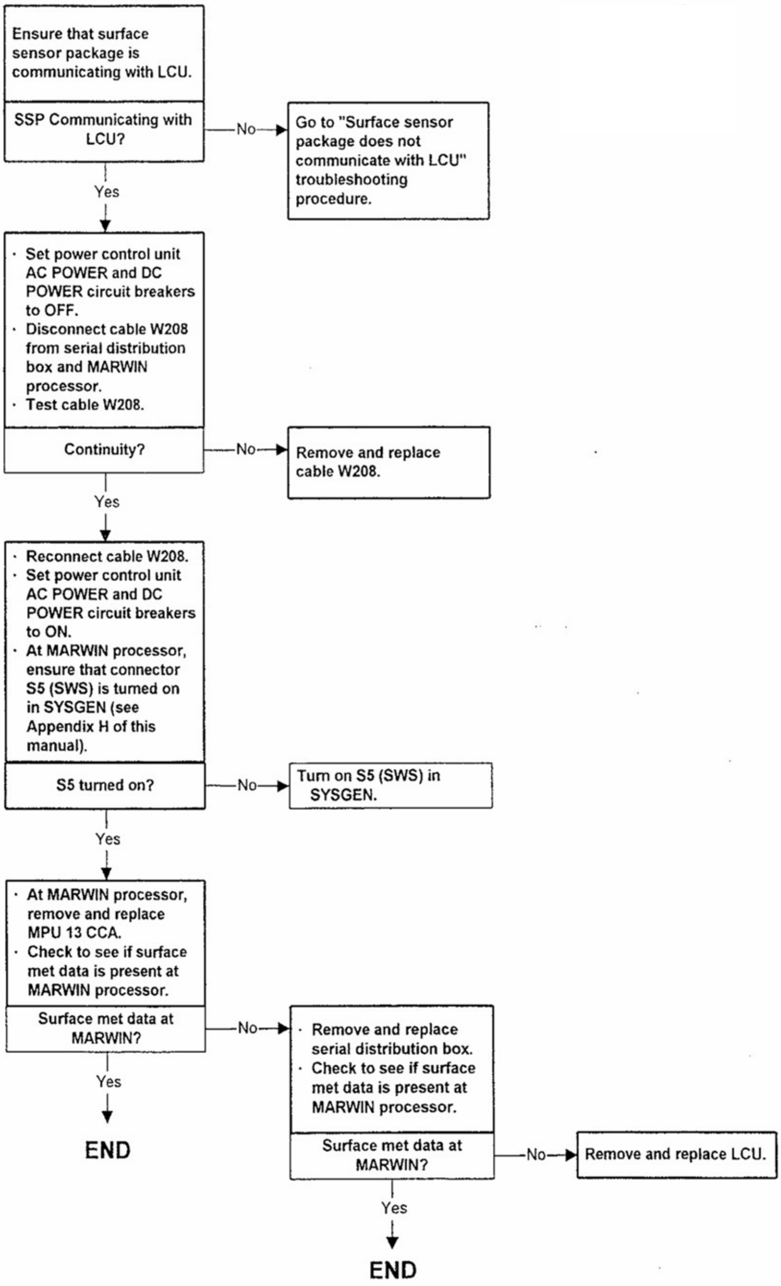
MARWIN troubleshooting flowchart

3-16.1 MARWIN PROCESSOR

No surface met data at MARWIN processor

INITIAL SETUP

Test Equipment	Tools and Special Tools	Conditions
Multimeter	None	Surface sensor package connected to MMS. Surface sensor package turned on and operating.


Ensure that surface sensor package is communicating with LCU.
SSP Communicating with LCU?
No
Go to "Surface sensor package does not communicate with LCU" troubleshooting procedure.
Yes
· Set power control unit AC POWER and DC POWER circuit breakers to OFF.
· Disconnect cable W208 from serial distribution box and MARWIN processor.
· Test cable W208.
Continuity?
No
Remove and replace cable W208.
Yes
· Reconnect cable W208.
· Set power control unit AC POWER and DC POWER circuit breakers to ON.
· At MARWIN processor, ensure that connector S5 (SWS) is turned on in SYSGEN (see Appendix H of this manual).
S5 turned on?
No
Turn on S5 (SWS) in SYSGEN.
Yes
· At MARWIN processor, remove and replace MPU 13 CCA.
· Check to see if surface met data is present at MARWIN processor.
Surface met data at MARWIN?
Yes
END
No
· Remove and replace serial distribution box.
· Check to see if surface met data is present at MARWIN processor.
Surface met data at MARWIN?
No
Remove and replace LCU.
Yes
END

MARWIN troubleshooting flowchart

3-17. MARWIN PROCESSOR

ON, OFF, and/or RESET switches do not function when STD BY LED is illuminated.

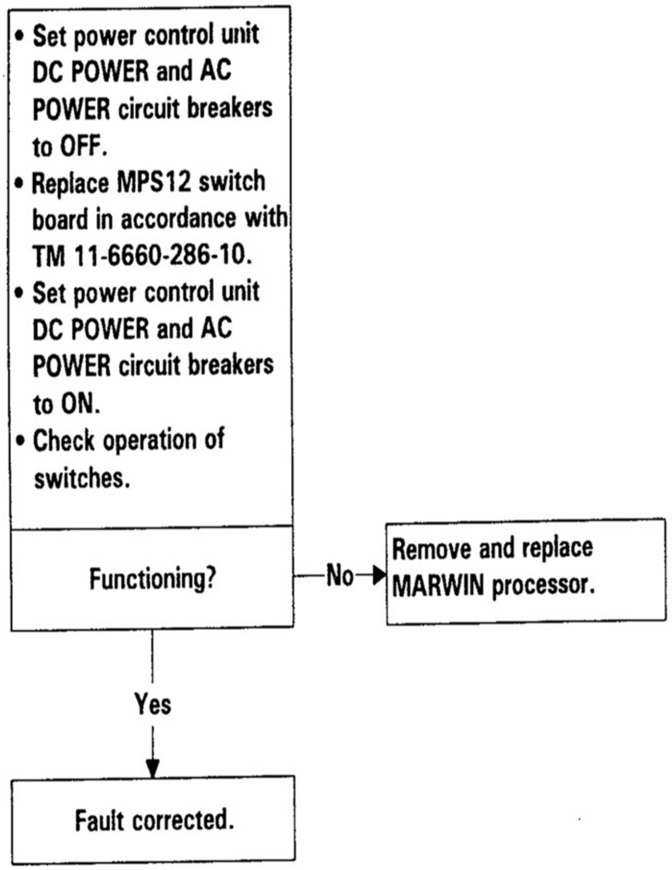
(Sheet 1 of 1)

INITIAL SETUP

Test Equipment
None

Tools and Special Tools
None

Conditions
System powered up and operating.



- Set power control unit DC POWER and AC POWER circuit breakers to OFF.
- Replace MPS12 switch board in accordance with TM 11-6660-286-10.
- Set power control unit DC POWER and AC POWER circuit breakers to ON.
- Check operation of switches.

Functioning?

Remove and replace MARWIN processor.

Fault corrected.

MARWIN troubleshooting flowchart

3-18. MARWIN PROCESSOR

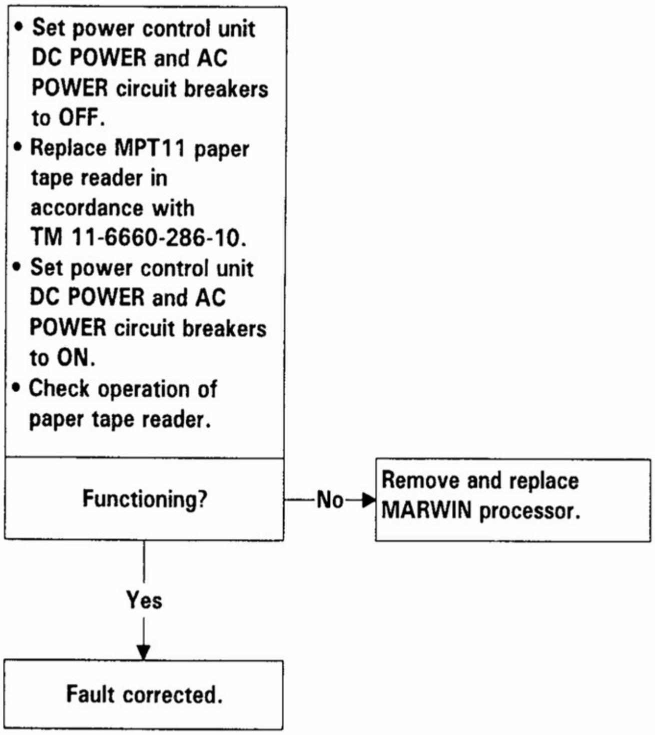
Paper tape reader does not read calibration tape. **(Sheet 1 of 1)**

INITIAL SETUP

Test Equipment
None

Tools and Special Tools
None

Conditions
MARWIN processor operating.


• Set power control unit DC POWER and AC POWER circuit breakers to OFF.
• Replace MPT11 paper tape reader in accordance with TM 11-6660-286-10.
• Set power control unit DC POWER and AC POWER circuit breakers to ON.
• Check operation of paper tape reader.
Functioning?
No
Remove and replace MARWIN processor.
Yes
Fault corrected.

MARWIN troubleshooting flowchart

3-19. MARWIN PROCESSOR
Powers up only partially.

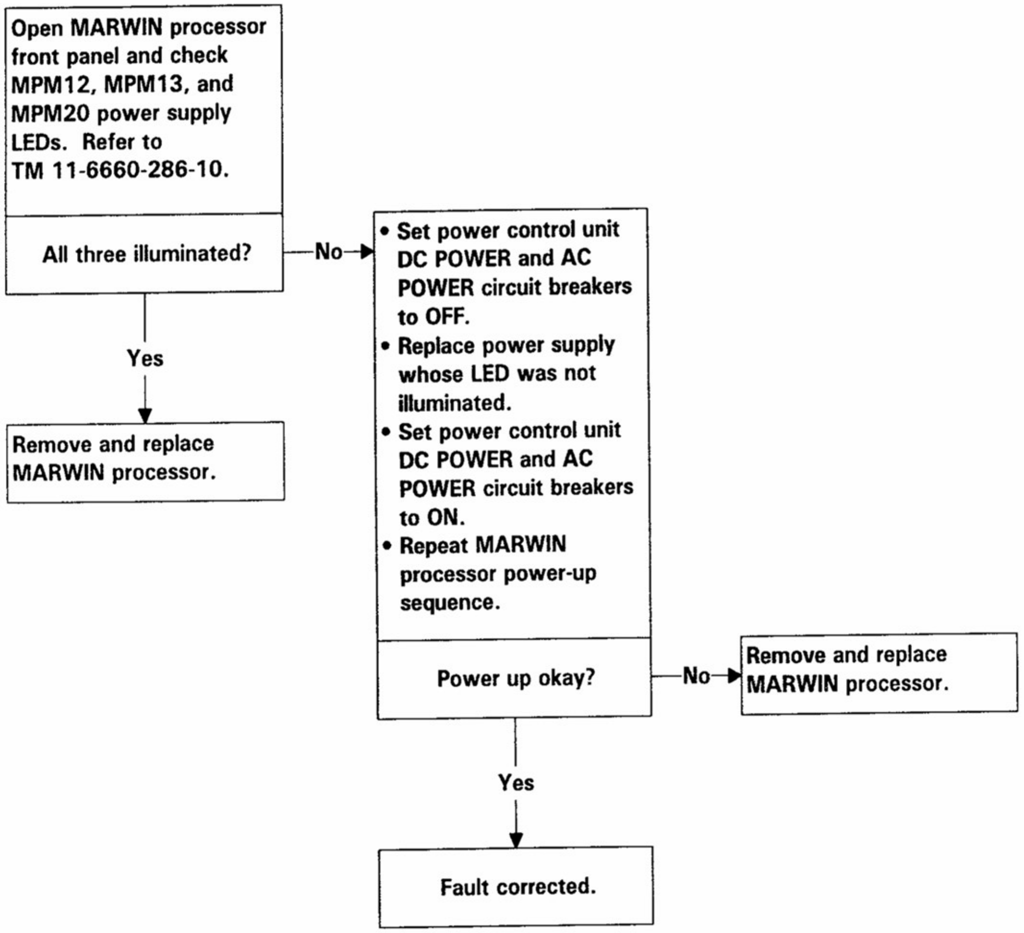
(Sheet 1 of 1)

INITIAL SETUP

Test Equipment
None

Tools and Special Tools
None

Conditions
STD BY LED is on.


Open MARWIN processor front panel and check MPM12, MPM13, and MPM20 power supply LEDs. Refer to TM 11-6660-286-10.
All three illuminated?
Yes
Remove and replace MARWIN processor.
No
• Set power control unit DC POWER and AC POWER circuit breakers to OFF.
• Replace power supply whose LED was not illuminated.
• Set power control unit DC POWER and AC POWER circuit breakers to ON.
• Repeat MARWIN processor power-up sequence.
Power up okay?
No
Remove and replace MARWIN processor.
Yes
Fault corrected.

MARWIN troubleshooting flowchart

3-20. MARWIN PROCESSOR

PTU signal not audible in NAVAID mode. **(Sheet 1 of 2)**

INITIAL SETUP

Test Equipment
Multimeter

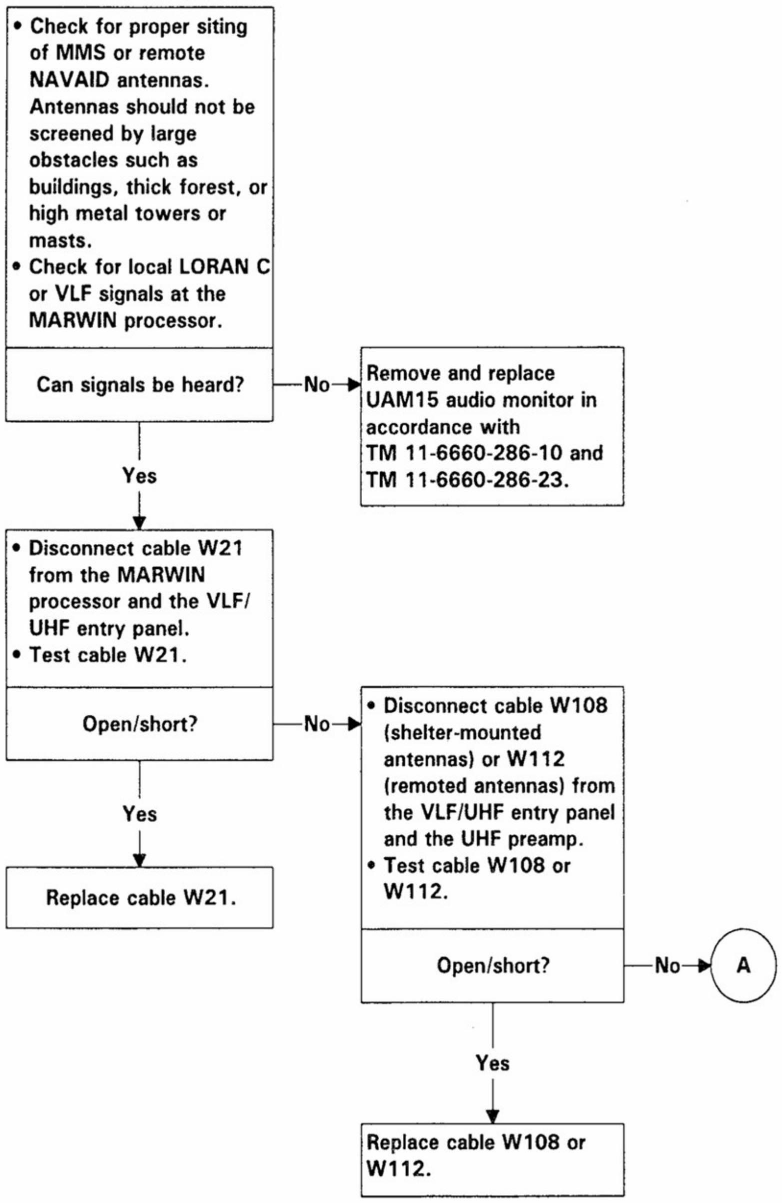
Tools and Special Tools
None

Conditions

Verified, activated radiosonde within 20 feet of NAVAID antennas.

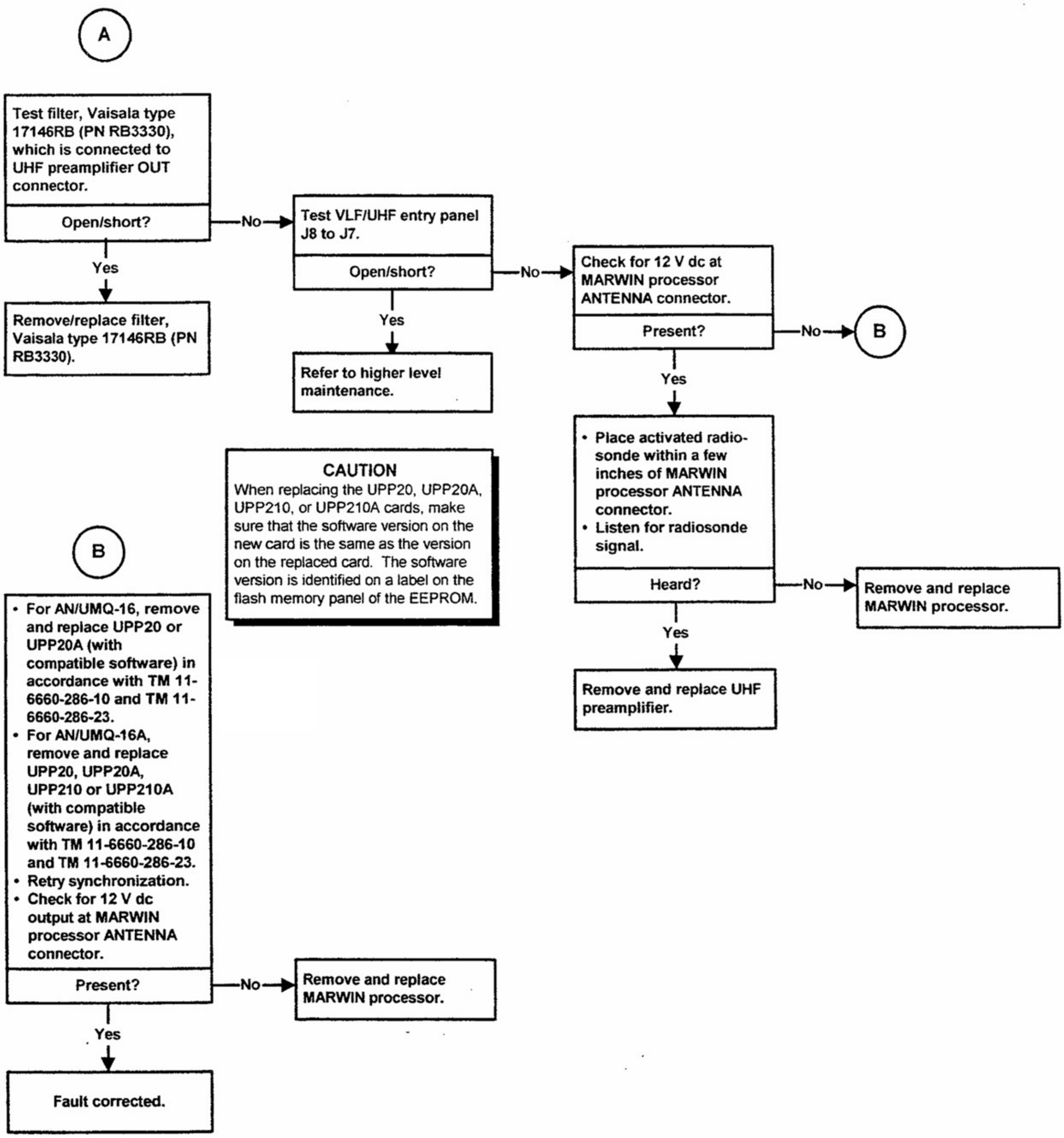
MARWIN processor operating.

Local NAVAID signals successfully synchronized.


• Check for proper siting of MMS or remote NAVAID antennas. Antennas should not be screened by large obstacles such as buildings, thick forest, or high metal towers or masts.
• Check for local LORAN C or VLF signals at the MARWIN processor.
Can signals be heard?
No
Remove and replace UAM15 audio monitor in accordance with TM 11-6660-286-10 and TM 11-6660-286-23.
Yes
• Disconnect cable W21 from the MARWIN processor and the VLF/UHF entry panel.
• Test cable W21.
Open/short?
No
• Disconnect cable W108 (shelter-mounted antennas) or W112 (remoted antennas) from the VLF/UHF entry panel and the UHF preamp.
• Test cable W108 or W112.
Yes
Replace cable W21.
Open/short?
No
A
Yes
Replace cable W108 or W112.

MARWIN troubleshooting flowchart

3-20. MARWIN PROCESSOR
PTU signal not audible in NAVAID mode. (Sheet 2 of 2)

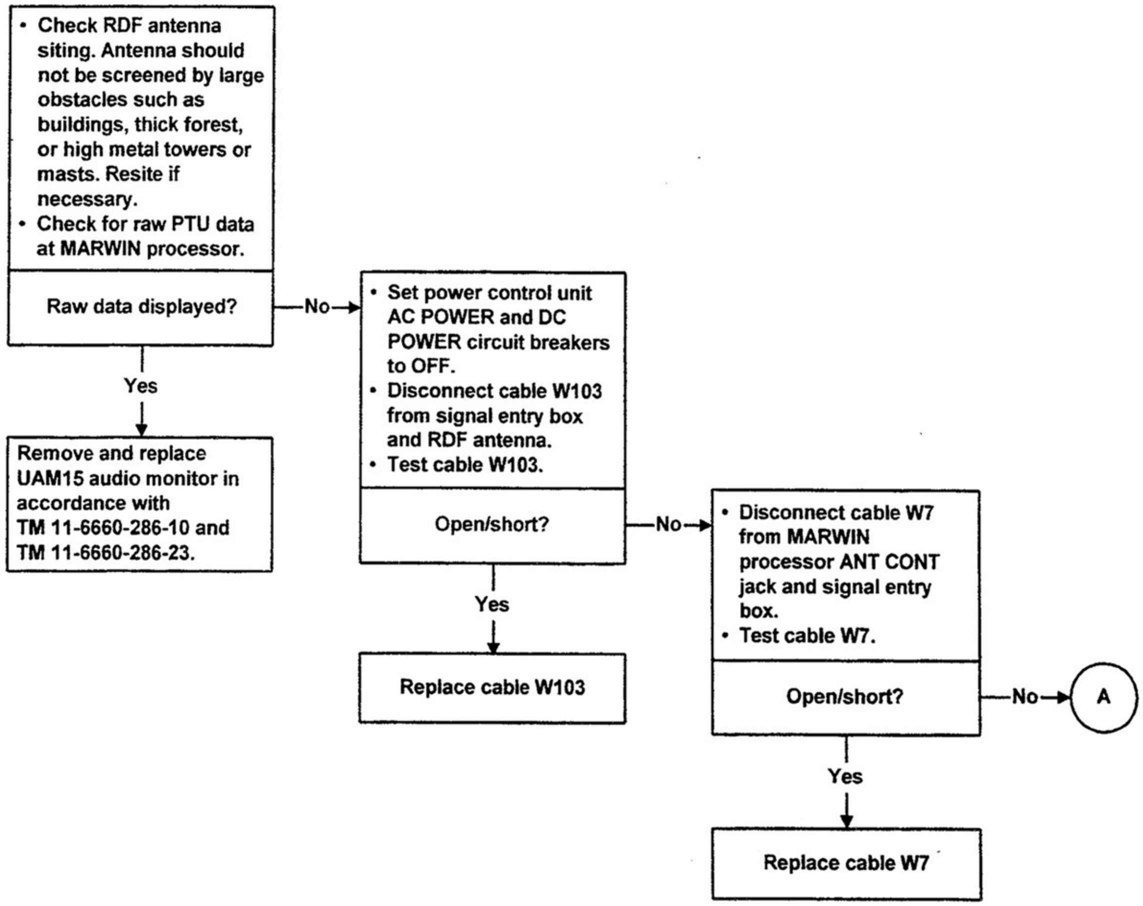

A
Test filter, Vaisala type 17146RB (PN RB3330), which is connected to UHF preamplifier OUT connector.
Open/short?
Yes
Remove/replace filter, Vaisala type 17146RB (PN RB3330).
No
Test VLF/UHF entry panel J8 to J7.
Open/short?
Yes
Refer to higher level maintenance.
No
Check for 12 V dc at MARWIN processor ANTENNA connector.
Present?
No
B
Yes
• Place activated radio-sonde within a few inches of MARWIN processor ANTENNA connector.
• Listen for radiosonde signal.
Heard?
No
Remove and replace MARWIN processor.
Yes
Remove and replace UHF preamplifier.
CAUTION
When replacing the UPP20, UPP20A, UPP210, or UPP210A cards, make sure that the software version on the new card is the same as the version on the replaced card. The software version is identified on a label on the flash memory panel of the EEPROM.
B
• For AN/UMQ-16, remove and replace UPP20 or UPP20A (with compatible software) in accordance with TM 11-6660-286-10 and TM 11-6660-286-23.
• For AN/UMQ-16A, remove and replace UPP20, UPP20A, UPP210 or UPP210A (with compatible software) in accordance with TM 11-6660-286-10 and TM 11-6660-286-23.
• Retry synchronization.
• Check for 12 V dc output at MARWIN processor ANTENNA connector.
Present?
No
Remove and replace MARWIN processor.
Yes
Fault corrected.

MARWIN troubleshooting flowchart

3-21. MARWIN PROCESSOR

PTU signal not audible in RDF mode.

(Sheet 1 of 2)

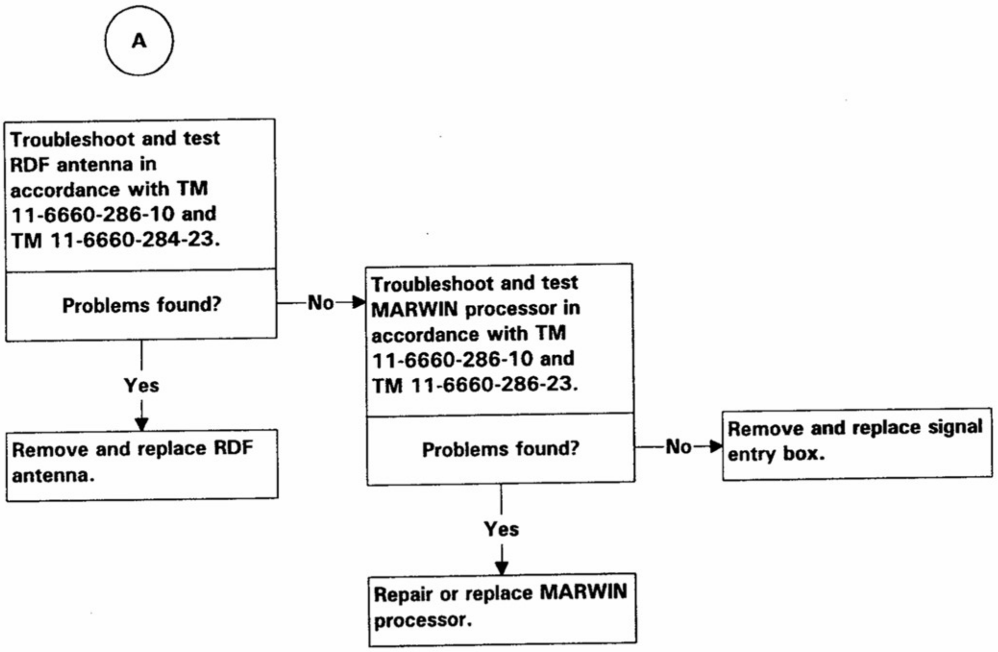

• Check RDF antenna siting. Antenna should not be screened by large obstacles such as buildings, thick forest, or high metal towers or masts. Resite if necessary.
• Check for raw PTU data at MARWIN processor.
Raw data displayed?
Yes
Remove and replace UAM15 audio monitor in accordance with TM 11-6660-286-10 and TM 11-6660-286-23.
No
• Set power control unit AC POWER and DC POWER circuit breakers to OFF.
• Disconnect cable W103 from signal entry box and RDF antenna.
• Test cable W103.
Open/short?
Yes
Replace cable W103
No
• Disconnect cable W7 from MARWIN processor ANT CONT jack and signal entry box.
• Test cable W7.
Open/short?
Yes
Replace cable W7
No
A

MARWIN troubleshooting flowchart

3-21. MARWIN PROCESSOR

PTU signal not audible in RDF mode.

(Sheet 2 of 2)


A
Troubleshoot and test RDF antenna in accordance with TM 11-6660-286-10 and TM 11-6660-284-23.
Problems found?
Yes
Remove and replace RDF antenna.
No
Troubleshoot and test MARWIN processor in accordance with TM 11-6660-286-10 and TM 11-6660-286-23.
Problems found?
Yes
Repair or replace MARWIN processor.
No
Remove and replace signal entry box.

MARWIN troubleshooting flowchart

3-22. MARWIN PROCESSOR

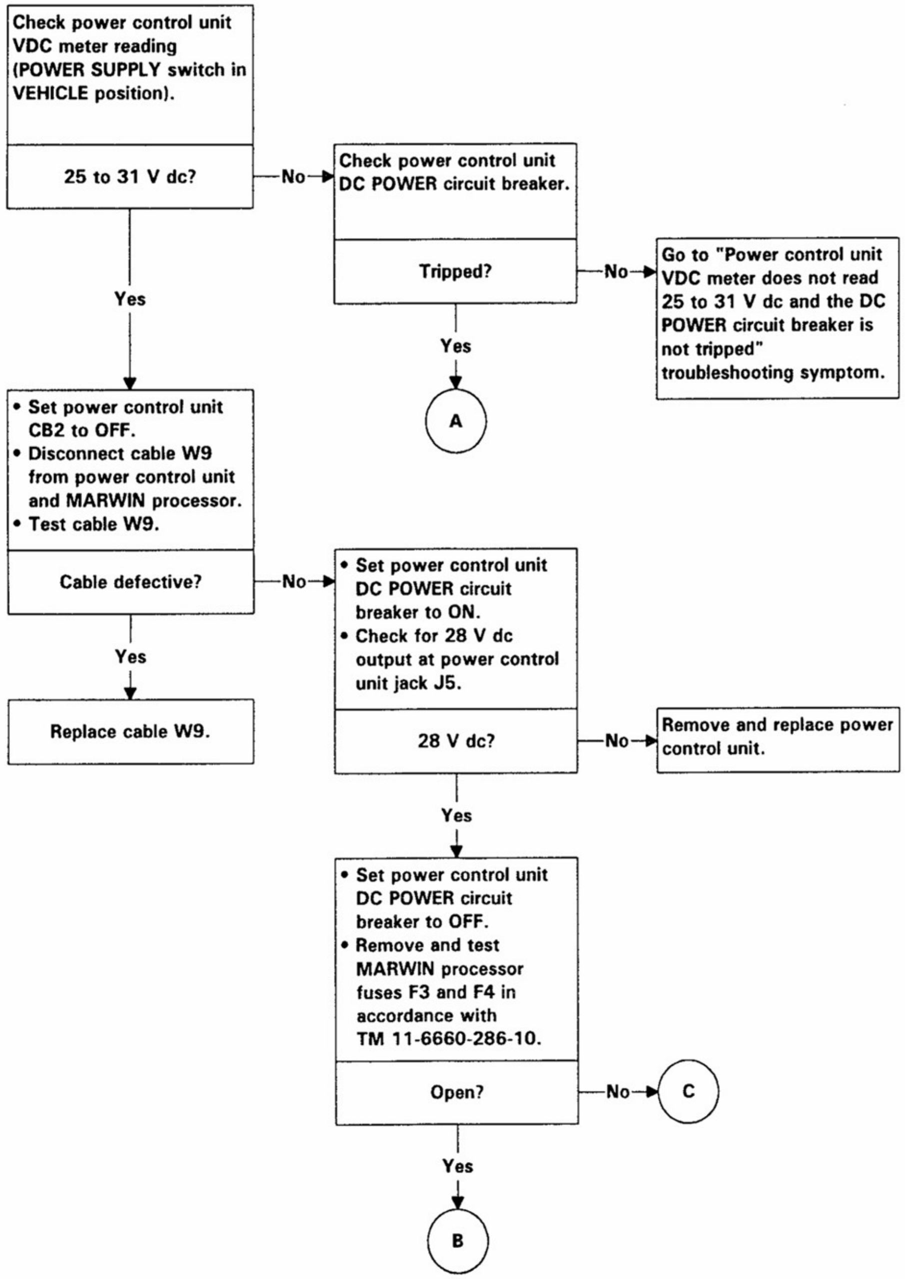
STD BY LED does not illuminate when DC power is applied. (Sheet 1 of 3)

INITIAL SETUP

Test Equipment
Multimeter

Tools and Special Tools
None

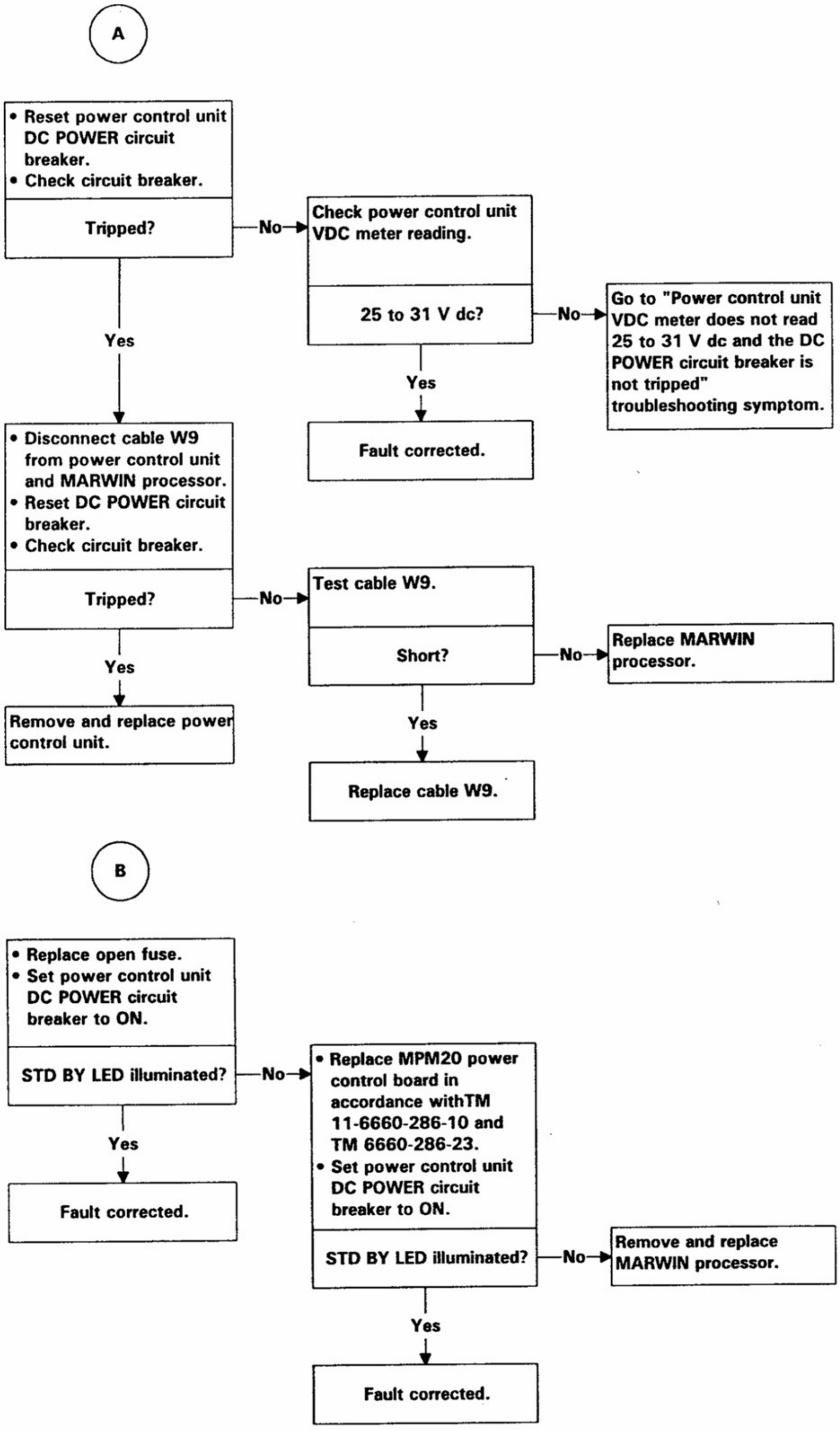
Conditions
MMS operating from verified 28 V dc power source.


Check power control unit VDC meter reading (POWER SUPPLY switch in VEHICLE position).
25 to 31 V dc?
No
Check power control unit DC POWER circuit breaker.
Tripped?
No
Go to "Power control unit VDC meter does not read 25 to 31 V dc and the DC POWER circuit breaker is not tripped" troubleshooting symptom.
Yes
A
Yes
• Set power control unit CB2 to OFF.
• Disconnect cable W9 from power control unit and MARWIN processor.
• Test cable W9.
Cable defective?
Yes
Replace cable W9.
No
• Set power control unit DC POWER circuit breaker to ON.
• Check for 28 V dc output at power control unit jack J5.
28 V dc?
No
Remove and replace power control unit.
Yes
• Set power control unit DC POWER circuit breaker to OFF.
• Remove and test MARWIN processor fuses F3 and F4 in accordance with TM 11-6660-286-10.
Open?
No
C
Yes
B

MARWIN troubleshooting flowchart

3-22. MARWIN PROCESSOR

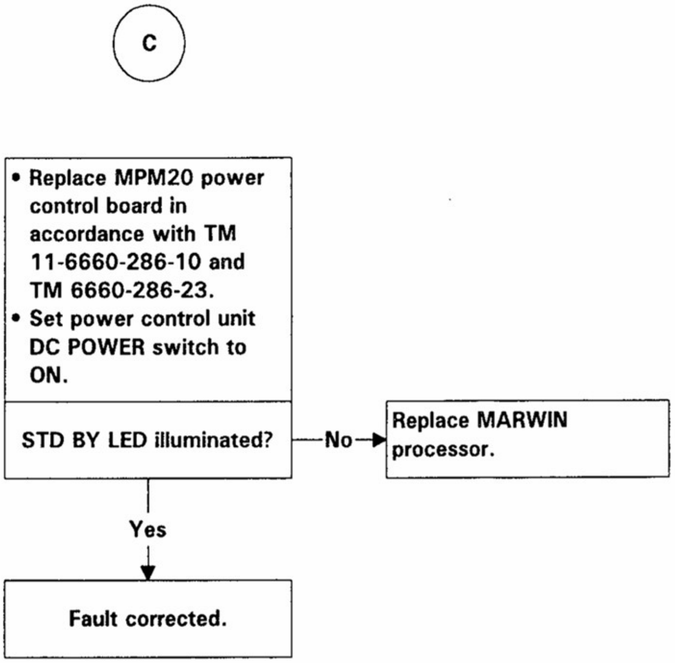
STD BY LED does not illuminate when DC power is applied. (Sheet 2 of 3)


A
• Reset power control unit DC POWER circuit breaker.
• Check circuit breaker.
Tripped?
No
Check power control unit VDC meter reading.
25 to 31 V dc?
No
Go to "Power control unit VDC meter does not read 25 to 31 V dc and the DC POWER circuit breaker is not tripped" troubleshooting symptom.
Yes
Fault corrected.
Yes
• Disconnect cable W9 from power control unit and MARWIN processor.
• Reset DC POWER circuit breaker.
• Check circuit breaker.
Tripped?
No
Test cable W9.
Short?
No
Replace MARWIN processor.
Yes
Replace cable W9.
Yes
Remove and replace power control unit.
B
• Replace open fuse.
• Set power control unit DC POWER circuit breaker to ON.
STD BY LED illuminated?
No
• Replace MPM20 power control board in accordance withTM 11-6660-286-10 and TM 6660-286-23.
• Set power control unit DC POWER circuit breaker to ON.
STD BY LED illuminated?
No
Remove and replace MARWIN processor.
Yes
Fault corrected.
Yes
Fault corrected.

MARWIN troubleshooting flowchart

3-22. MARWIN PROCESSOR

STD BY LED does not illuminate when DC power is applied. (Sheet 3 of 3)


C
• Replace MPM20 power control board in accordance with TM 11-6660-286-10 and TM 6660-286-23.
• Set power control unit DC POWER switch to ON.
STD BY LED illuminated?
No
Replace MARWIN processor.
Yes
Fault corrected.

MARWIN troubleshooting flowchart

3-23. MARWIN PROCESSOR

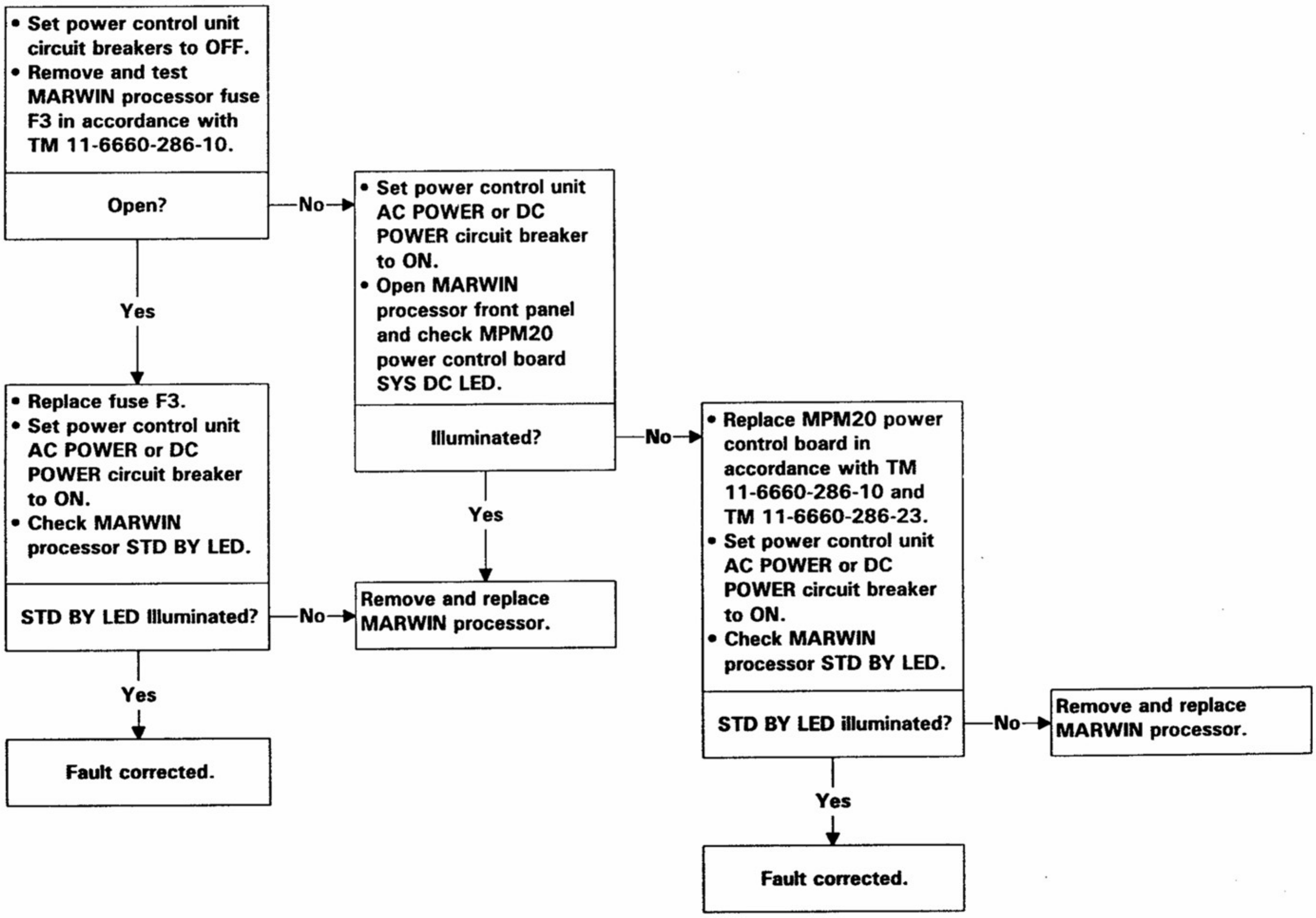
STD BY LED does not illuminate when F1 LED is illuminated. **(Sheet 1 of 1)**

INITIAL SETUP

Test Equipment
Multimeter

Tools and Special Tools
None

Conditions
MMS operating from verified 115 V ac or 28 V dc power source.


• Set power control unit circuit breakers to OFF.
• Remove and test MARWIN processor fuse F3 in accordance with TM 11-6660-286-10.
Open?
No
Yes
• Set power control unit AC POWER or DC POWER circuit breaker to ON.
• Open MARWIN processor front panel and check MPM20 power control board SYS DC LED.
Illuminated?
No
Yes
• Replace fuse F3.
• Set power control unit AC POWER or DC POWER circuit breaker to ON.
• Check MARWIN processor STD BY LED.
STD BY LED Illuminated?
No
Yes
Remove and replace MARWIN processor.
Fault corrected.
• Replace MPM20 power control board in accordance with TM 11-6660-286-10 and TM 11-6660-286-23.
• Set power control unit AC POWER or DC POWER circuit breaker to ON.
• Check MARWIN processor STD BY LED.
STD BY LED illuminated?
No
Yes
Remove and replace MARWIN processor.
Fault corrected.

MARWIN troubleshooting flowchart

3-24. MARWIN PROCESSOR

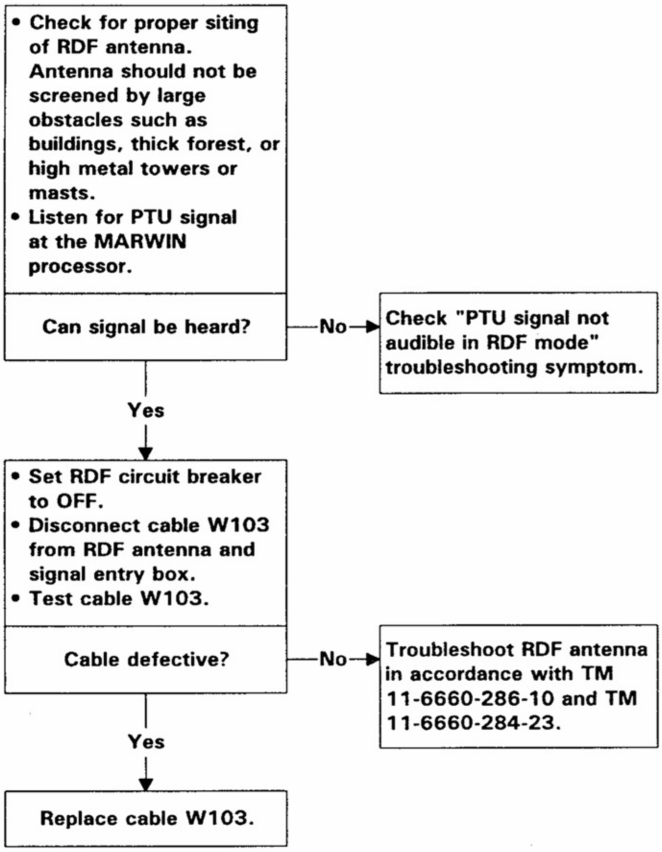
Wind direction and speed displayed as \\\ \\\\ in RDF mode **(Sheet 1 of 1)**

INITIAL SETUP

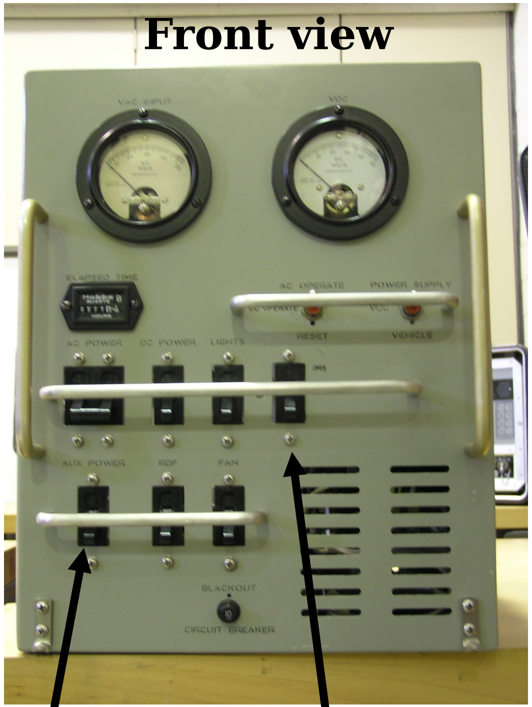
Test Equipment
Multimeter

Conditions
System powered up and operating.

Tools and Special Tools
None


• Check for proper siting of RDF antenna. Antenna should not be screened by large obstacles such as buildings, thick forest, or high metal towers or masts.
• Listen for PTU signal at the MARWIN processor.
Can signal be heard?
No
Check "PTU signal not audible in RDF mode" troubleshooting symptom.
Yes
• Set RDF circuit breaker to OFF.
• Disconnect cable W103 from RDF antenna and signal entry box.
• Test cable W103.
Cable defective?
No
Troubleshoot RDF antenna in accordance with TM 11-6660-286-10 and TM 11-6660-284-23.
Yes
Replace cable W103.

Power Control Unit component location & Identification

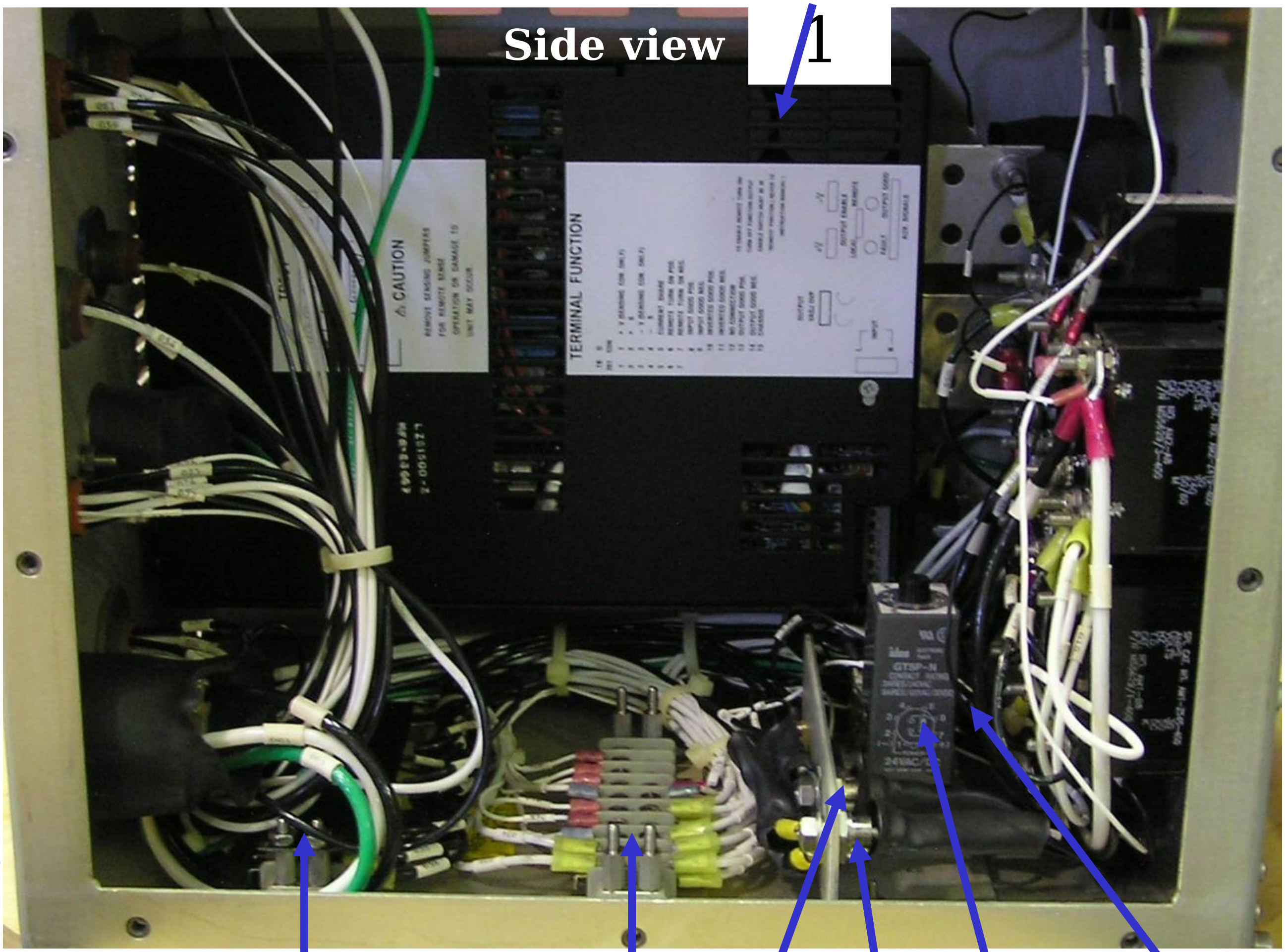


Circuit Breakers Top row

Left CB1 CB2 CB4 CB8 Right

Circuit Breakers Bottom row

Left CB6 CB5 CB3 Right


Side view
PS 1
TB1
TB2
CR 2
CR 1
K2
K1
Behind K2

Power Control Unit troubleshooting flowchart

4-6. POWER CONTROL UNIT

Troubleshoot and test power control unit

(Sheet 1 of 7)

INITIAL SETUP

Test Equipment

Multimeter

115 V ac power source

28 V dc power source

MS27467T17B065 connector to connect 28 V dc to power control unit J1.

Hubbell (CAGE 74545) connector, part number 2613 (or equivalent), to connect 115 V ac to power control unit J2.

Tools and Special Tools

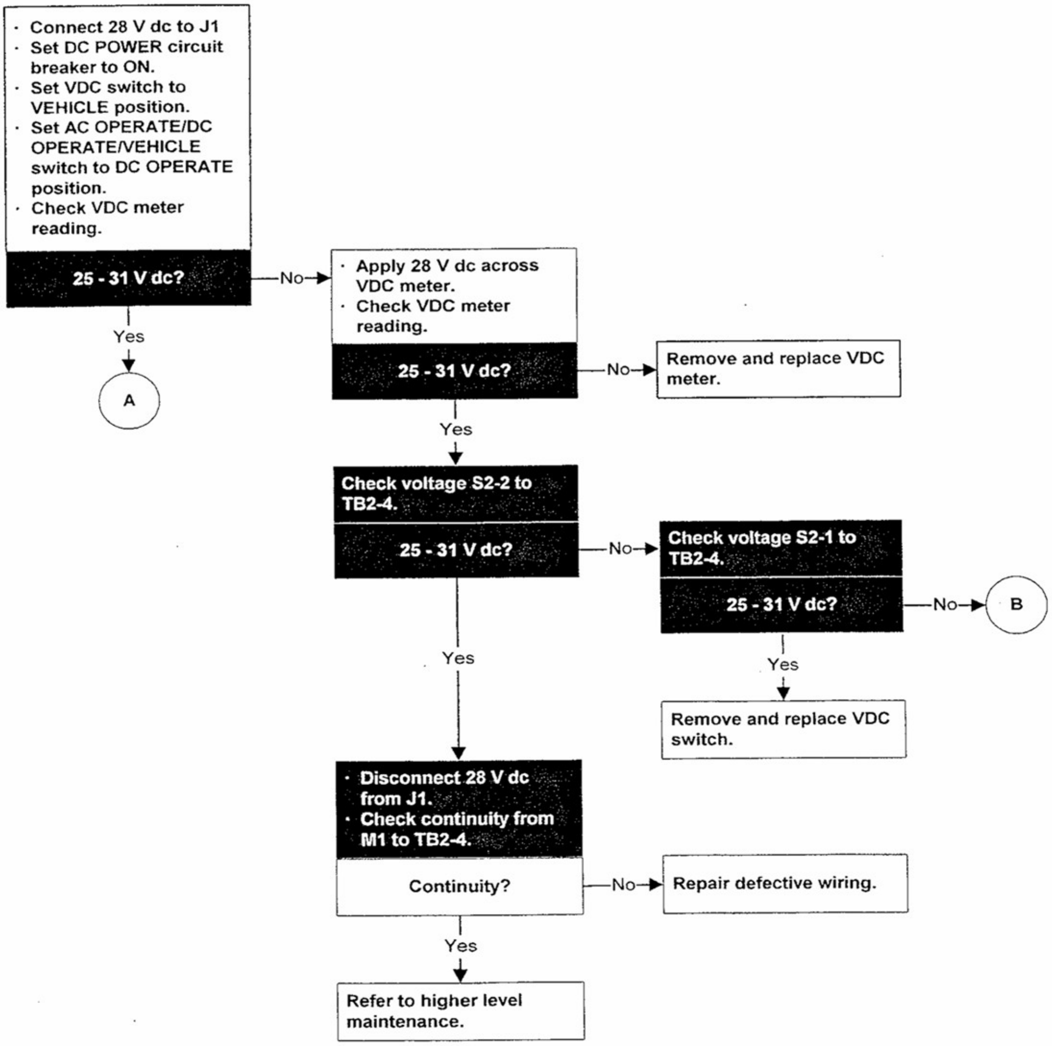
None

Conditions

Power control unit removed from shelter.

Drawings

Figure FO-2., Power Control Unit Schematic



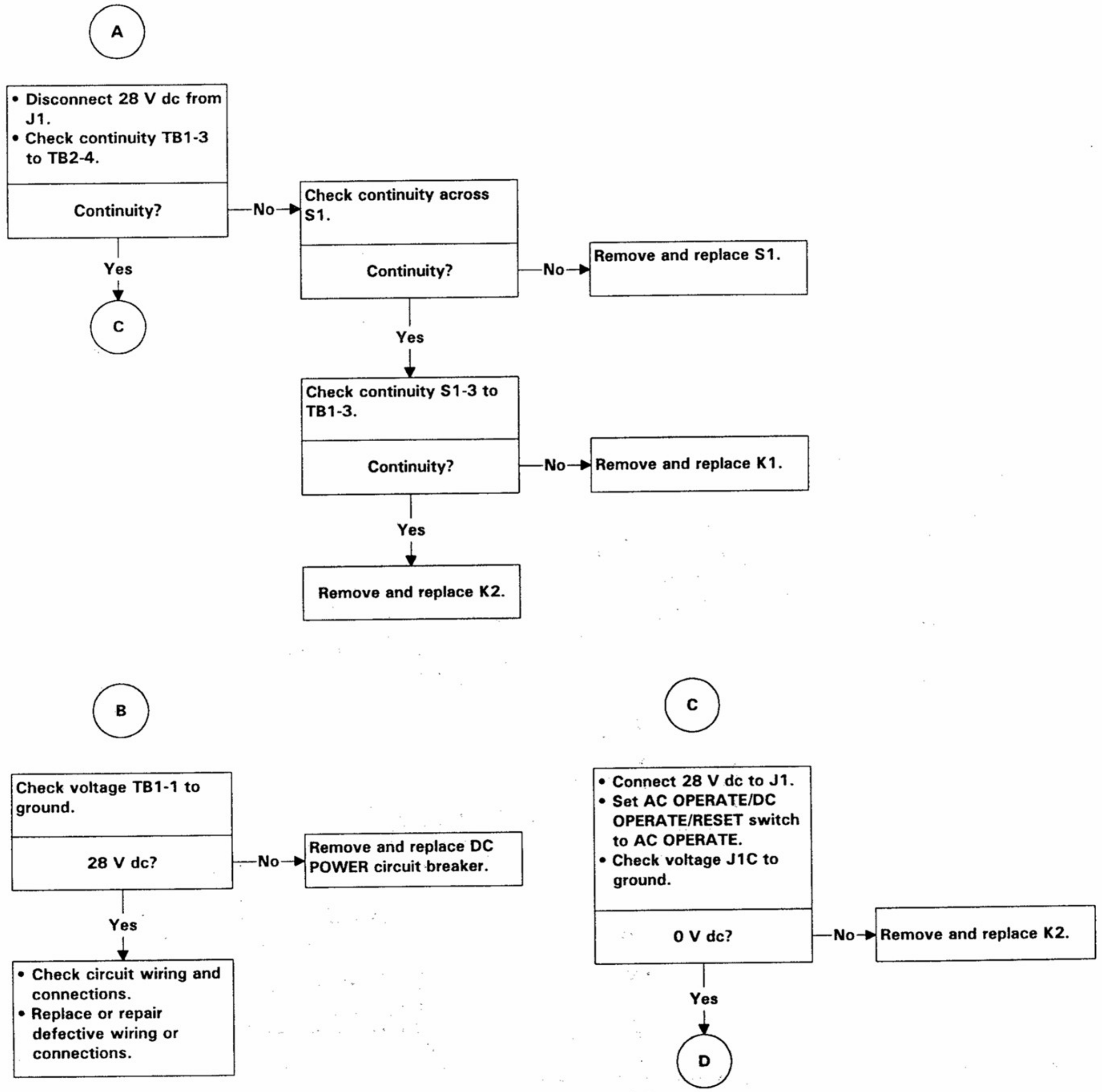
· Connect 28 V dc to J1
· Set DC POWER circuit breaker to ON.
· Set VDC switch to VEHICLE position.
· Set AC OPERATE/DC OPERATE/VEHICLE switch to DC OPERATE position.
· Check VDC meter reading.
25 - 31 V dc?
Yes
A
No
· Apply 28 V dc across VDC meter.
· Check VDC meter reading.
25 - 31 V dc?
No
Remove and replace VDC meter.
Yes
Check voltage S2-2 to TB2-4.
25 - 31 V dc?
No
Check voltage S2-1 to TB2-4.
25 - 31 V dc?
No
B
Yes
Remove and replace VDC switch.
Yes
· Disconnect 28 V dc from J1.
· Check continuity from M1 to TB2-4.
Continuity?
No
Repair defective wiring.
Yes
Refer to higher level maintenance.

Power Control Unit troubleshooting flowchart

4-6. POWER CONTROL UNIT

Troubleshoot and test power control unit

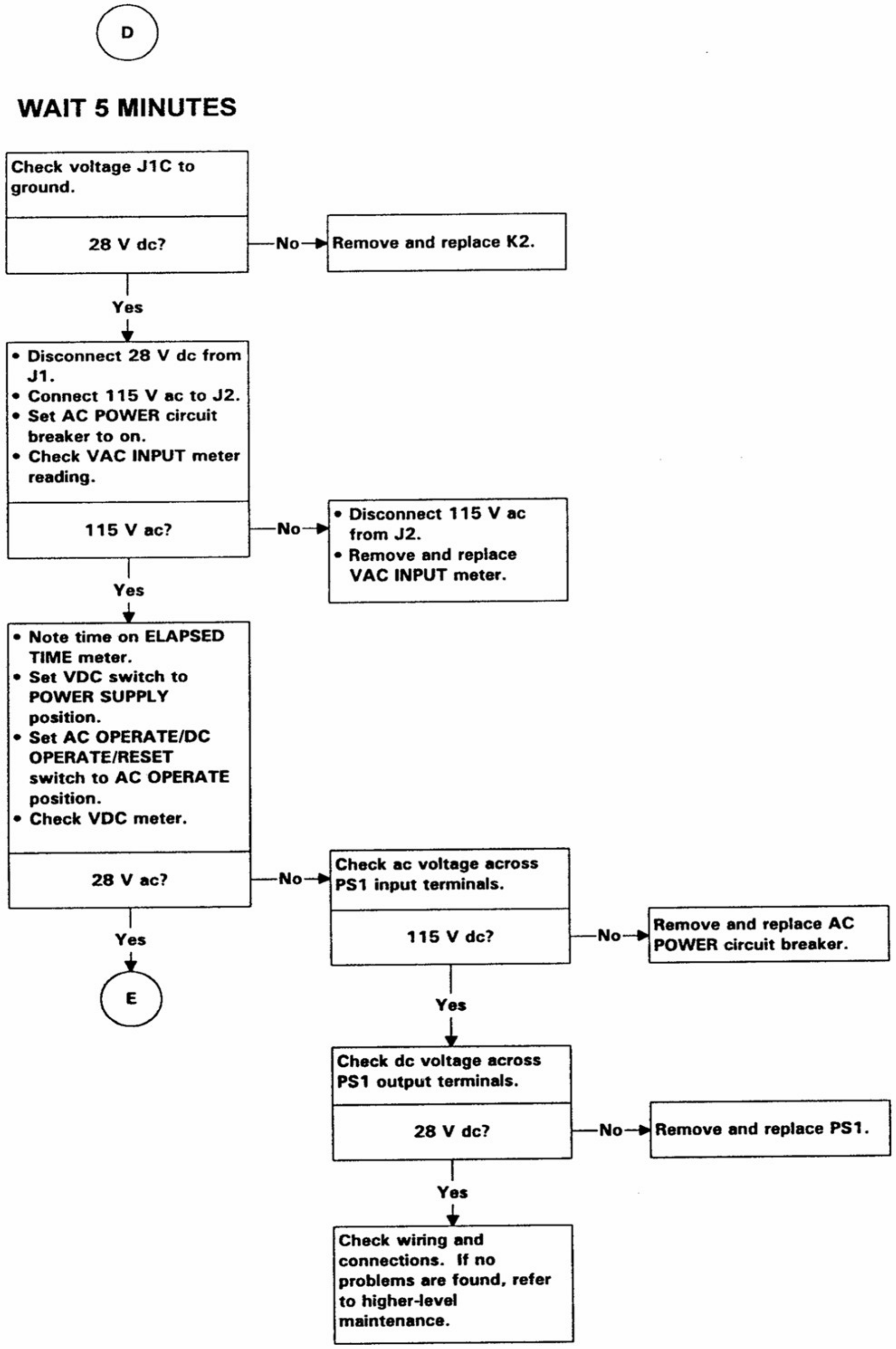
(Sheet 2 of 7)


A
• Disconnect 28 V dc from J1.
• Check continuity TB1-3 to TB2-4.
Continuity?
No
Yes
C
Check continuity across S1.
Continuity?
No
Remove and replace S1.
Yes
Check continuity S1-3 to TB1-3.
Continuity?
No
Remove and replace K1.
Yes
Remove and replace K2.
B
Check voltage TB1-1 to ground.
28 V dc?
No
Remove and replace DC POWER circuit breaker.
Yes
• Check circuit wiring and connections.
• Replace or repair defective wiring or connections.
C
• Connect 28 V dc to J1.
• Set AC OPERATE/DC OPERATE/RESET switch to AC OPERATE.
• Check voltage J1C to ground.
0 V dc?
No
Remove and replace K2.
Yes
D

Power Control Unit troubleshooting flowchart

4-6. POWER CONTROL UNIT
Troubleshoot and test power control unit

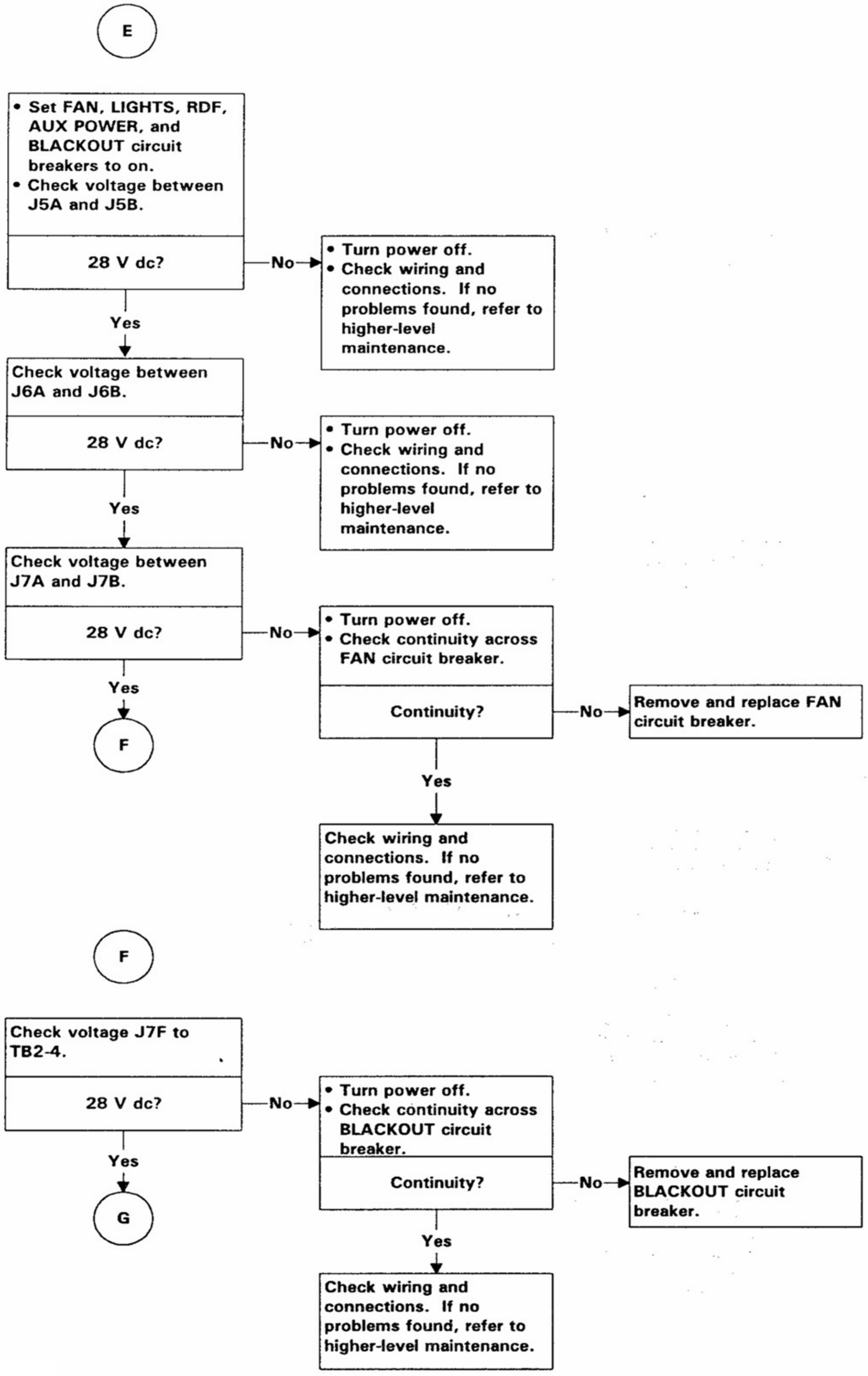
(Sheet 3 of 7)


D
WAIT 5 MINUTES
Check voltage J1C to ground.
28 V dc?
No
Remove and replace K2.
Yes
• Disconnect 28 V dc from J1.
• Connect 115 V ac to J2.
• Set AC POWER circuit breaker to on.
• Check VAC INPUT meter reading.
115 V ac?
No
• Disconnect 115 V ac from J2.
• Remove and replace VAC INPUT meter.
Yes
• Note time on ELAPSED TIME meter.
• Set VDC switch to POWER SUPPLY position.
• Set AC OPERATE/DC OPERATE/RESET switch to AC OPERATE position.
• Check VDC meter.
28 V ac?
Yes
E
No
Check ac voltage across PS1 input terminals.
115 V dc?
No
Remove and replace AC POWER circuit breaker.
Yes
Check dc voltage across PS1 output terminals.
28 V dc?
No
Remove and replace PS1.
Yes
Check wiring and connections. If no problems are found, refer to higher-level maintenance.

Power Control Unit troubleshooting flowchart

4-6. POWER CONTROL UNIT

Troubleshoot and test power control unit (Sheet 4 of 7)

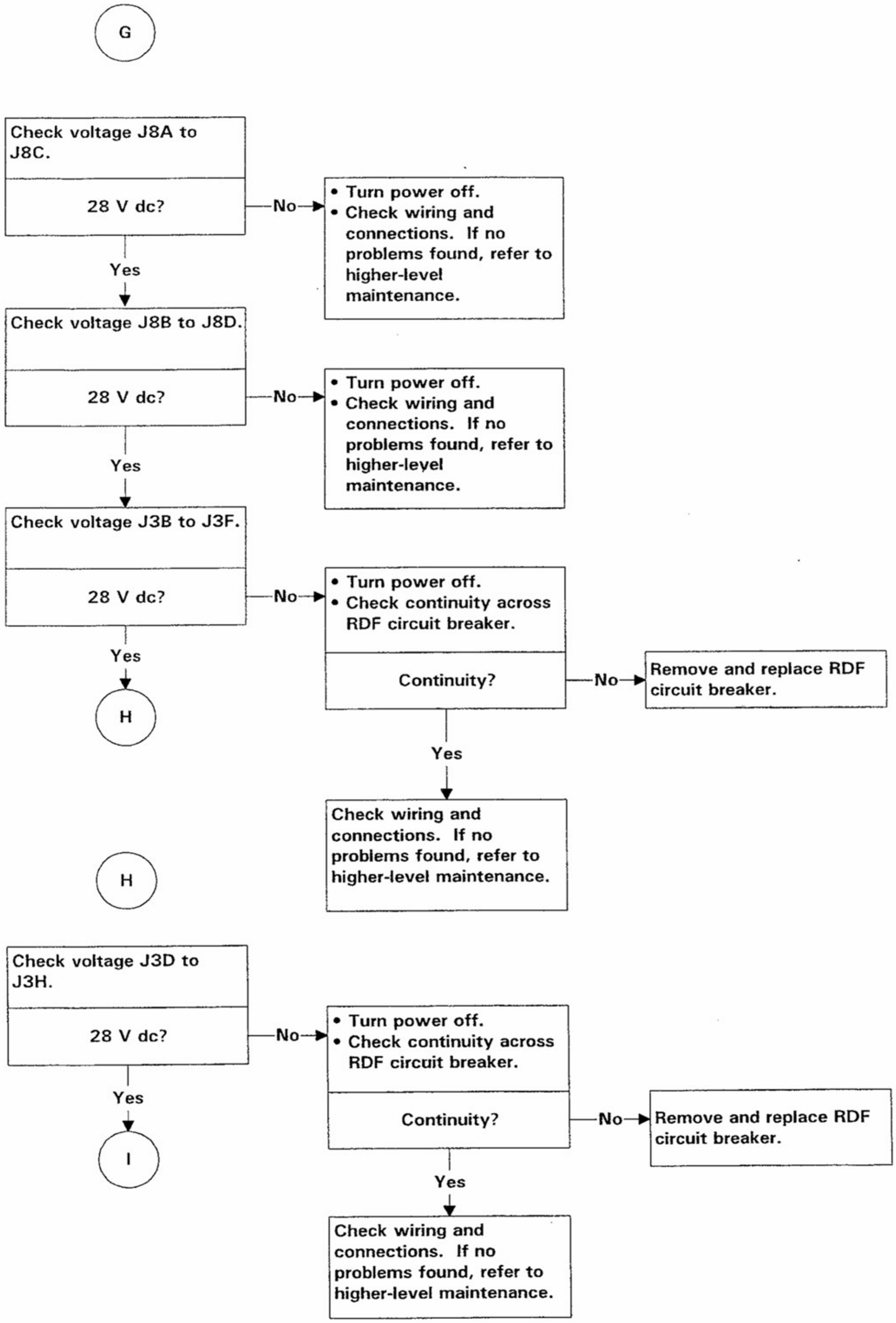

E
• Set FAN, LIGHTS, RDF, AUX POWER, and BLACKOUT circuit breakers to on.
• Check voltage between J5A and J5B.
28 V dc?
No
• Turn power off.
• Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
Check voltage between J6A and J6B.
28 V dc?
No
• Turn power off.
• Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
Check voltage between J7A and J7B.
28 V dc?
No
• Turn power off.
• Check continuity across FAN circuit breaker.
Continuity?
No
Remove and replace FAN circuit breaker.
Yes
Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
F
F
Check voltage J7F to TB2-4.
28 V dc?
No
• Turn power off.
• Check continuity across BLACKOUT circuit breaker.
Continuity?
No
Remove and replace BLACKOUT circuit breaker.
Yes
Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
G

Power Control Unit troubleshooting flowchart

4-6. POWER CONTROL UNIT

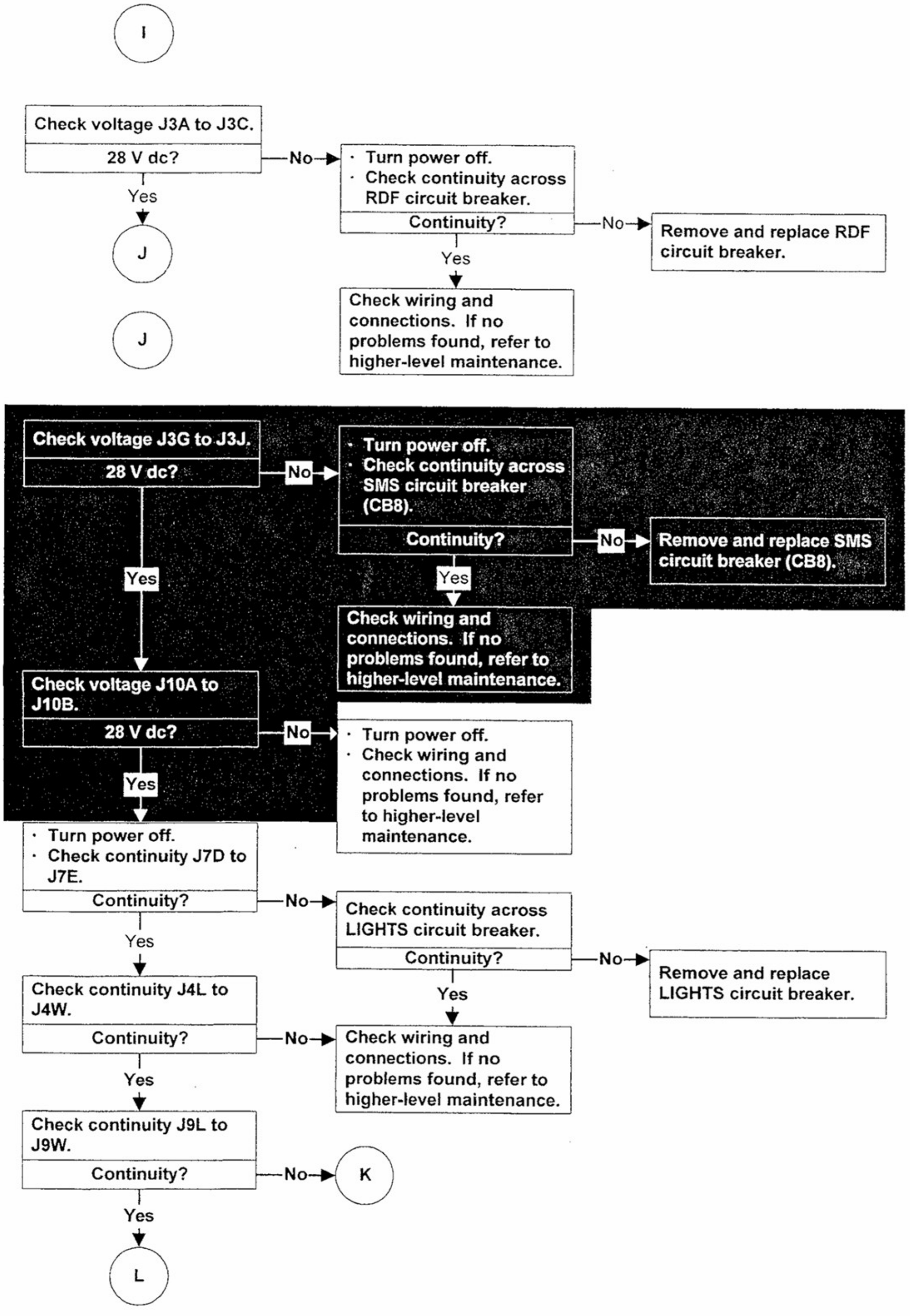
Troubleshoot and test power control unit

(Sheet 5 of 7)


G
Check voltage J8A to J8C.
28 V dc?
No
• Turn power off.
• Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
Check voltage J8B to J8D.
28 V dc?
No
• Turn power off.
• Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
Check voltage J3B to J3F.
28 V dc?
No
• Turn power off.
• Check continuity across RDF circuit breaker.
Continuity?
No
Remove and replace RDF circuit breaker.
Yes
Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
H
H
Check voltage J3D to J3H.
28 V dc?
No
• Turn power off.
• Check continuity across RDF circuit breaker.
Continuity?
No
Remove and replace RDF circuit breaker.
Yes
Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
I

Power Control Unit troubleshooting flowchart

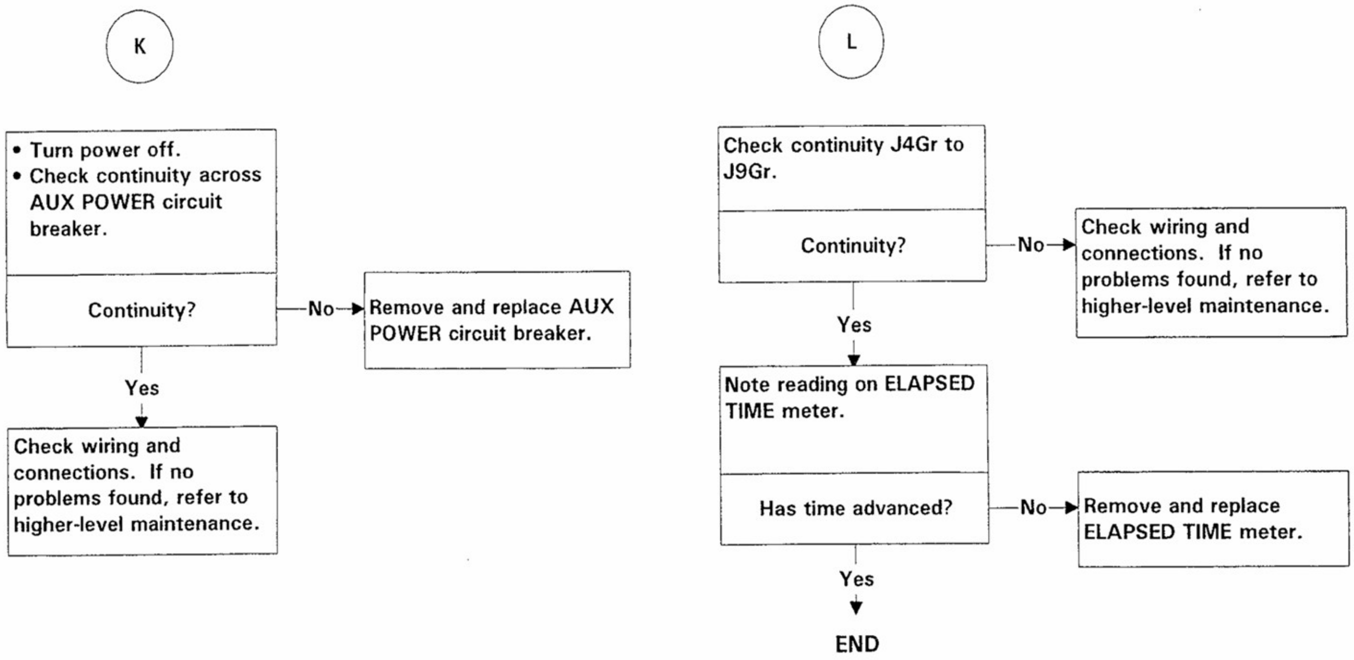
4-6. POWER CONTROL UNIT
Troubleshoot and test power control unit (Sheet 6 of 7)


I
Check voltage J3A to J3C.
28 V dc?
No
Yes
J
· Turn power off.
· Check continuity across RDF circuit breaker.
Continuity?
No
Remove and replace RDF circuit breaker.
Yes
Check wiring and connections. If no problems found, refer to higher-level maintenance.
J
Check voltage J3G to J3J.
28 V dc?
No
· Turn power off.
· Check continuity across SMS circuit breaker (CB8).
Continuity?
No
Remove and replace SMS circuit breaker (CB8).
Yes
Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
Check voltage J10A to J10B.
28 V dc?
No
· Turn power off.
· Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
· Turn power off.
· Check continuity J7D to J7E.
Continuity?
No
Check continuity across LIGHTS circuit breaker.
Continuity?
No
Remove and replace LIGHTS circuit breaker.
Yes
Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
Check continuity J4L to J4W.
Continuity?
No
Yes
Check continuity J9L to J9W.
Continuity?
No
K
Yes
L

Power Control Unit troubleshooting flowchart

4-6. POWER CONTROL UNIT
Troubleshoot and test power control unit

(Sheet 7 of 7)


K
• Turn power off.
• Check continuity across AUX POWER circuit breaker.
Continuity?
No
Remove and replace AUX POWER circuit breaker.
Yes
Check wiring and connections. If no problems found, refer to higher-level maintenance.
L
Check continuity J4Gr to J9Gr.
Continuity?
No
Check wiring and connections. If no problems found, refer to higher-level maintenance.
Yes
Note reading on ELAPSED TIME meter.
Has time advanced?
No
Remove and replace ELAPSED TIME meter.
Yes
END

Power Control Unit troubleshooting flowchart

3-26. POWER CONTROL UNIT

VDC meter does not read 25 to 31 V dc and DC POWER circuit breaker is not tripped

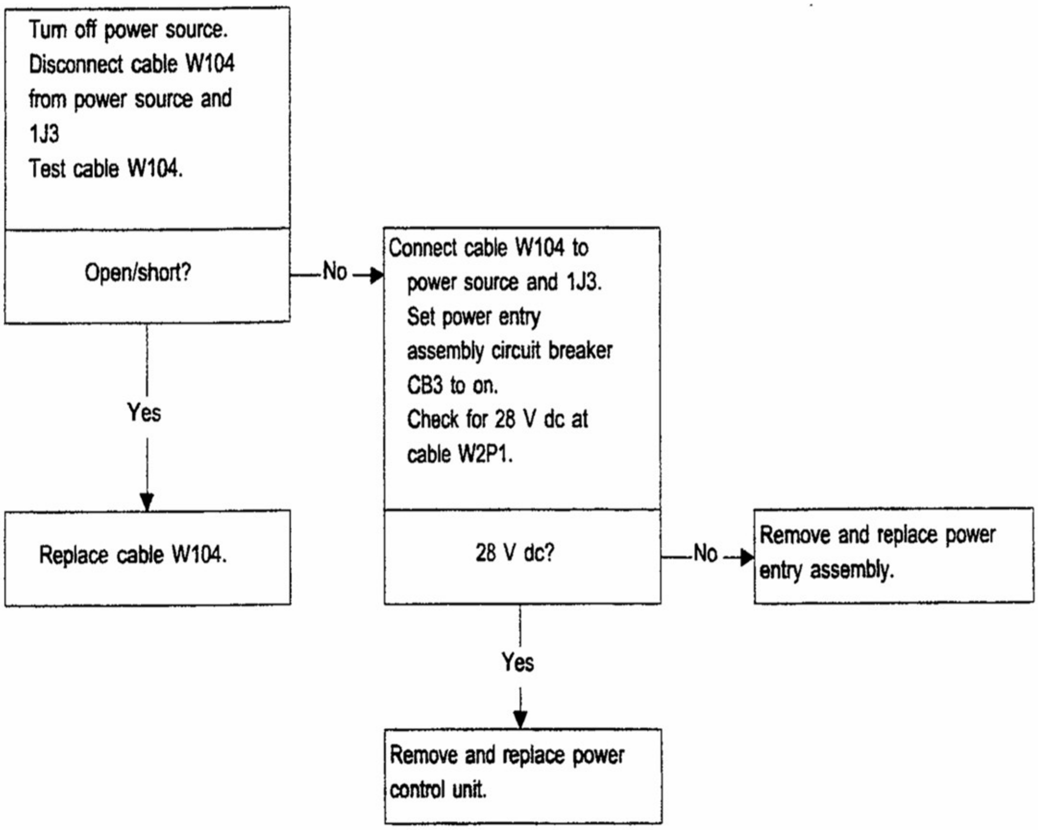
(Sheet 1 of 1)

INITIAL SETUP

Test Equipment
Multimeter

Tools and Special Tools
None

Conditions
Verified 28 V dc power source connected to 1J3.
VDC switch in VEHICLE position.


Turn off power source. Disconnect cable W104 from power source and 1J3 Test cable W104.
Open/short?
No
Yes
Replace cable W104.
Connect cable W104 to power source and 1J3. Set power entry assembly circuit breaker CB3 to on. Check for 28 V dc at cable W2P1.
28 V dc?
No
Remove and replace power entry assembly.
Yes
Remove and replace power control unit.

Power Control Unit troubleshooting flowchart

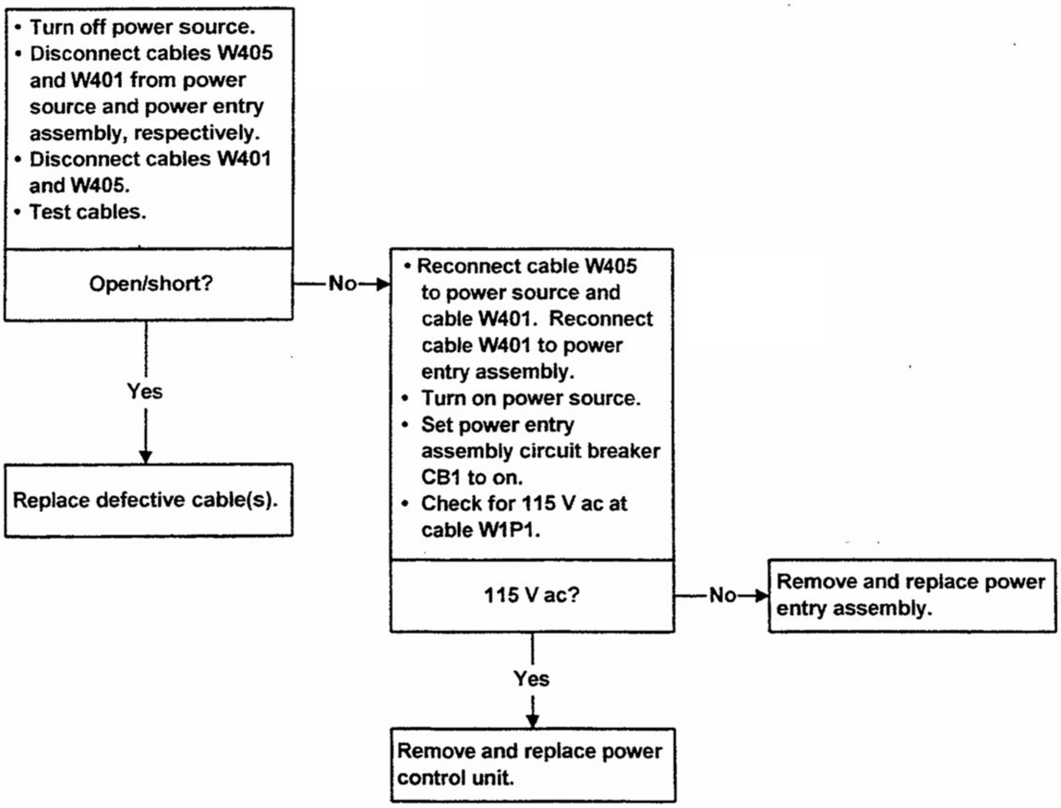
3-25.1. POWER CONTROL UNIT FOR AN/TMQ-41A MMS
VAC INPUT meter does not read 108 to 132 V ac. (Sheet 1 of 1)

INITIAL SETUP

Test Equipment
Multimeter

Tools and Special Tools
None

Conditions
Verified 115 V ac power source connected to W405.



- Turn off power source.
- Disconnect cables W405 and W401 from power source and power entry assembly, respectively.
- Disconnect cables W401 and W405.
- Test cables.

Open/short?

Yes → Replace defective cable(s).

No →

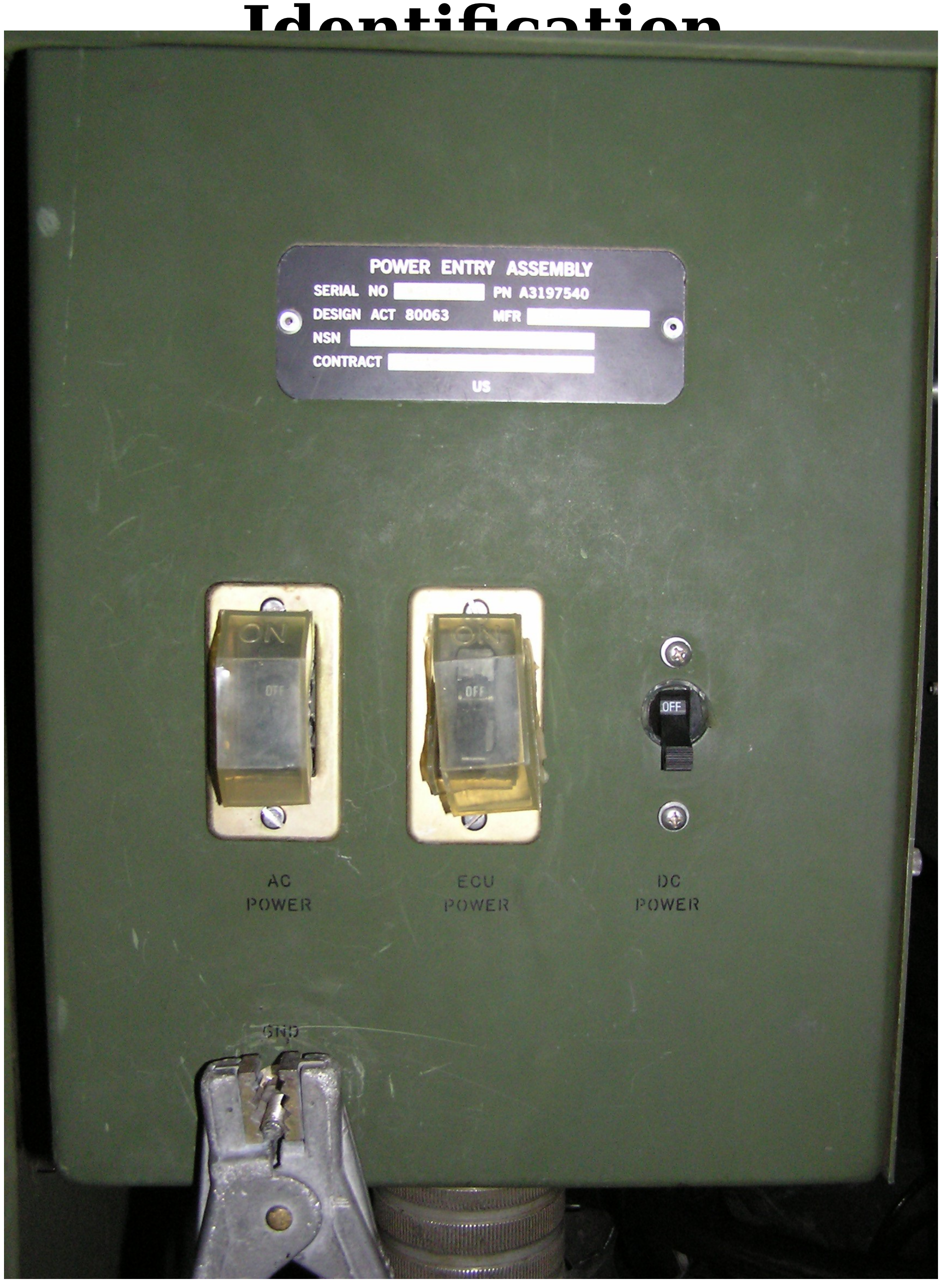
- Reconnect cable W405 to power source and cable W401. Reconnect cable W401 to power entry assembly.
- Turn on power source.
- Set power entry assembly circuit breaker CB1 to on.
- Check for 115 V ac at cable W1P1.

115 V ac?

Yes → Remove and replace power control unit.

No → Remove and replace power entry assembly.

Power Entry Assembly component location & Identification


POWER ENTRY ASSEMBLY
SERIAL NO
PN A3197540
DESIGN ACT 80063
MFR
NSN
CONTRACT
US
ON
OFF
ON
OFF
OFF
AC POWER
ECU POWER
DC POWER
GND

PEA troubleshooting flowchart

4-8. POWER ENTRY ASSEMBLY

Troubleshoot and test power entry assembly **(Sheet 1 of 5)**

INITIAL SETUP

Test Equipment

Multimeter
28 V dc power source
115 V ac power source
MS90557C32412S connector to connect
115 V ac to power entry assembly J1

Tools and Special Tools

None

Conditions

Power entry assembly removed from shelter.

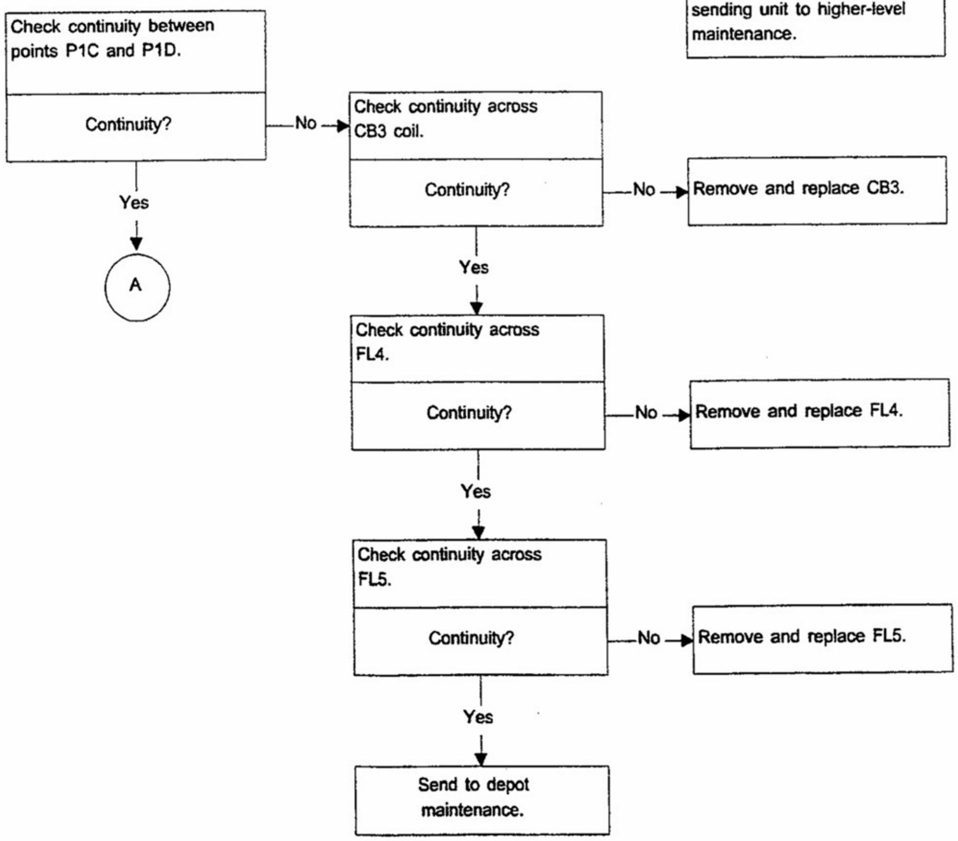
Drawings

Figure 4-3., AN/TMQ-41 Power Entry Assembly Schematic (Sheet 4 of this paragraph).

Figure 4-4., AN/TMQ-41A Power Entry Assembly Schematic (Sheet 5 of this paragraph).

NOTE

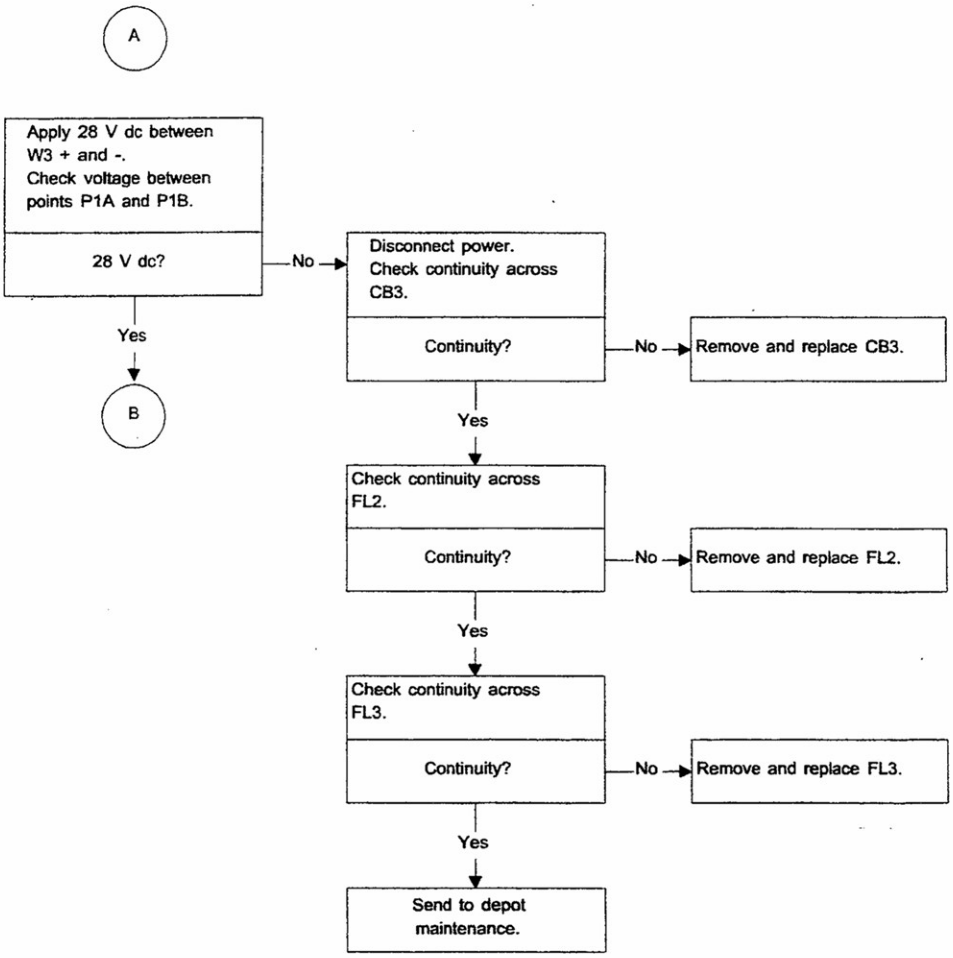
Perform continuity checks to eliminate cabling as a source of failure before sending unit to higher-level maintenance.


Check continuity between points P1C and P1D.
Continuity?
No
Yes
A
Check continuity across CB3 coil.
Continuity?
No
Remove and replace CB3.
Yes
Check continuity across FL4.
Continuity?
No
Remove and replace FL4.
Yes
Check continuity across FL5.
Continuity?
No
Remove and replace FL5.
Yes
Send to depot maintenance.

PCU troubleshooting flowchart

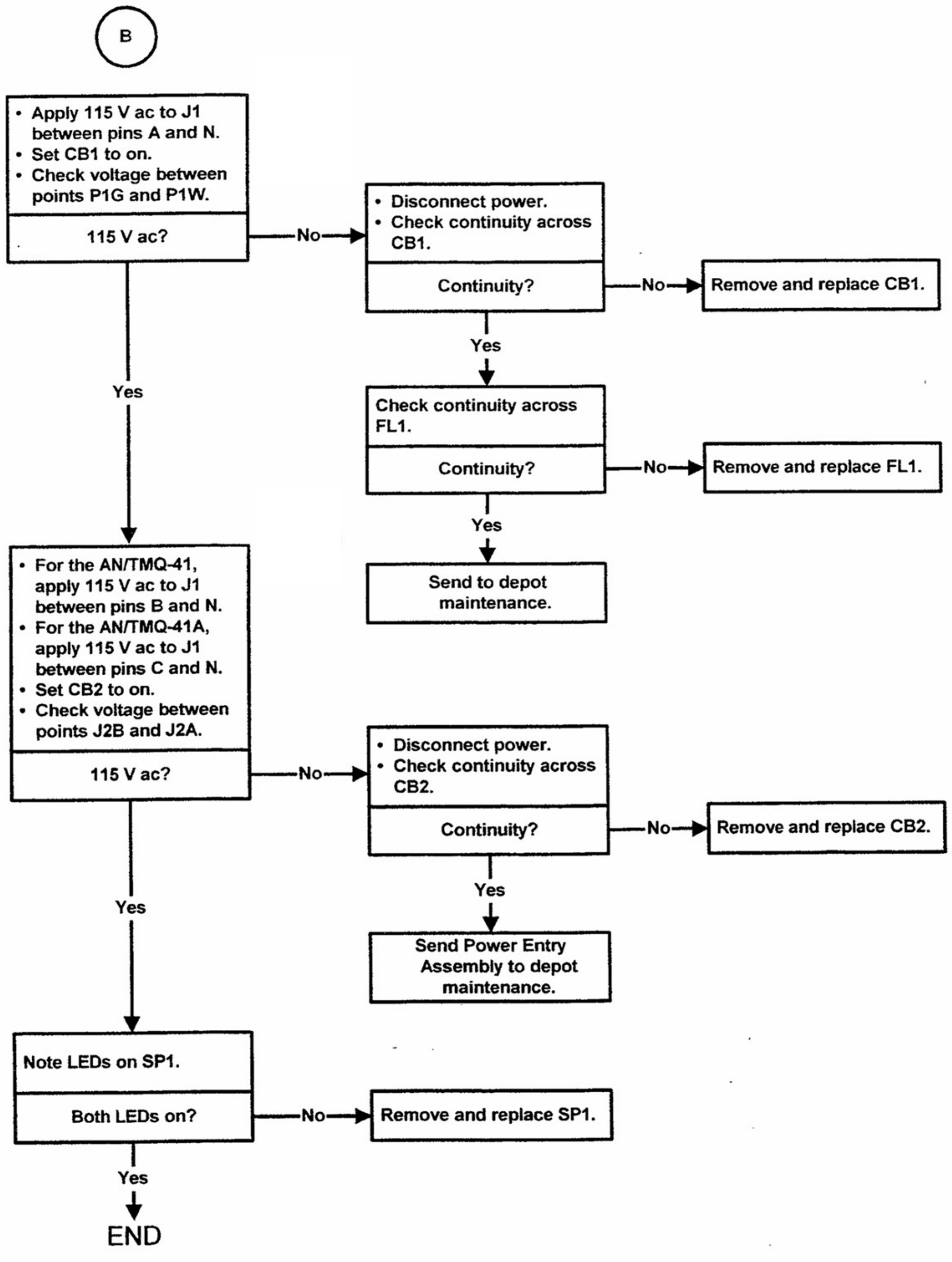
4-8. POWER ENTRY ASSEMBLY

Troubleshoot and test power entry assembly (Sheet 2 of 5)

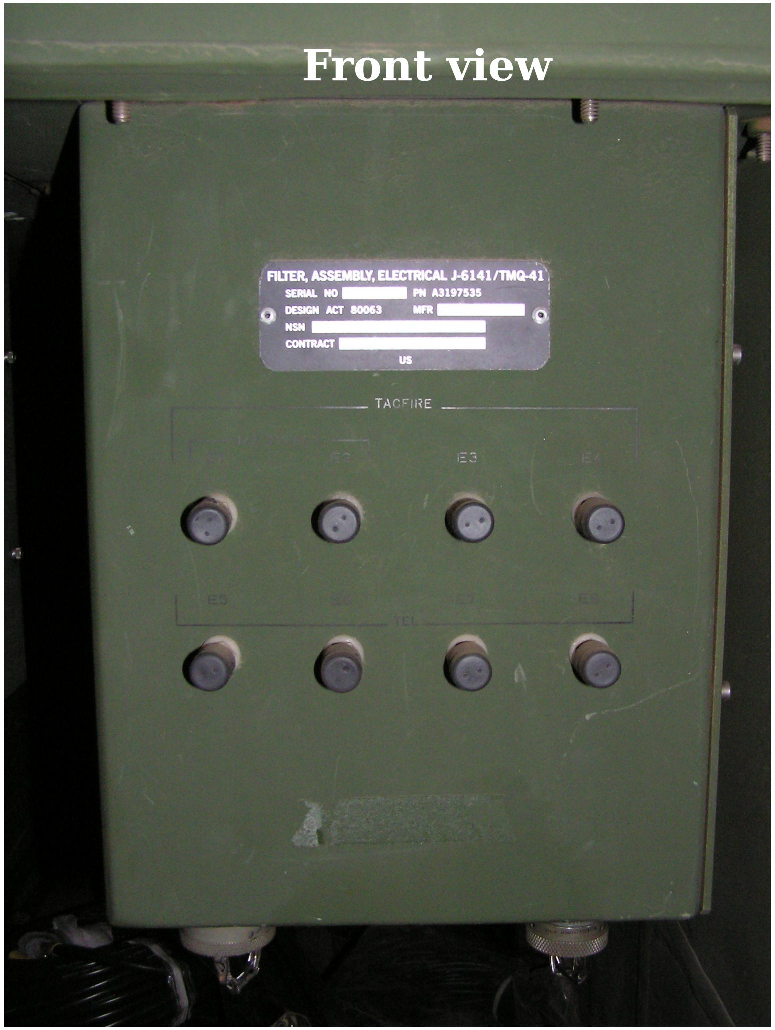

A
Apply 28 V dc between W3 + and -. Check voltage between points P1A and P1B.
28 V dc?
Yes
B
No
Disconnect power. Check continuity across CB3.
Continuity?
No
Remove and replace CB3.
Yes
Check continuity across FL2.
Continuity?
No
Remove and replace FL2.
Yes
Check continuity across FL3.
Continuity?
No
Remove and replace FL3.
Yes
Send to depot maintenance.

PCU troubleshooting flowchart

4-8. POWER ENTRY ASSEMBLY
Troubleshoot and test power entry assembly (Sheet 3 of 5)


B
Apply 115 V ac to J1 between pins A and N.
Set CB1 to on.
Check voltage between points P1G and P1W.
115 V ac?
No
Disconnect power.
Check continuity across CB1.
Continuity?
No
Remove and replace CB1.
Yes
Check continuity across FL1.
Continuity?
No
Remove and replace FL1.
Yes
Send to depot maintenance.
Yes
For the AN/TMQ-41, apply 115 V ac to J1 between pins B and N.
For the AN/TMQ-41A, apply 115 V ac to J1 between pins C and N.
Set CB2 to on.
Check voltage between points J2B and J2A.
115 V ac?
No
Disconnect power.
Check continuity across CB2.
Continuity?
No
Remove and replace CB2.
Yes
Send Power Entry Assembly to depot maintenance.
Yes
Note LEDs on SP1.
Both LEDs on?
No
Remove and replace SP1.
Yes
END

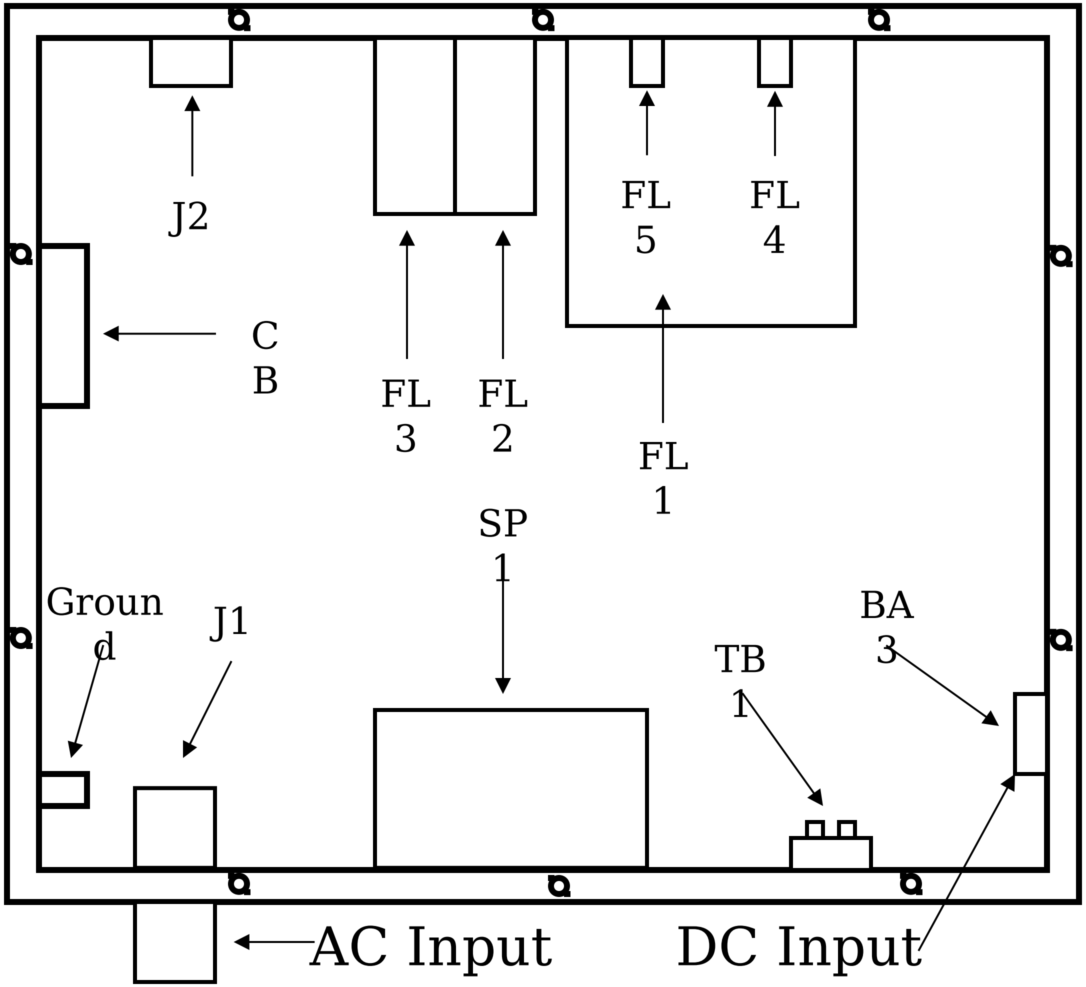
Signal Entry Box component location & Identification



Front view

FILTER, ASSEMBLY, ELECTRICAL J-6141/TMQ-41
SERIAL NO [redacted]
PN A3197535
DESIGN ACT 80063
MFR [redacted]
NSN [redacted]
CONTRACT [redacted]
US
TACFIRE
E3
TEL

Side view



J2
FL 5
FL 4
C B
FL 3
FL 2
FL 1
SP 1
Ground
J1
TB 1
BA 3
AC Input
DC Input

Signal Entry Box troubleshooting flowchart

4-7. SIGNAL ENTRY BOX

Troubleshoot and test signal entry box (Sheet 1 of 6)

INITIAL SETUP

Test Equipment

Multimeter

Variable current-limited (100 mA or less) power source, 25 V dc to about 100 V dc.

MS3474W14-09S connector to allow connection of 28 V dc to cable W1 pins.

Tools and Special Tools

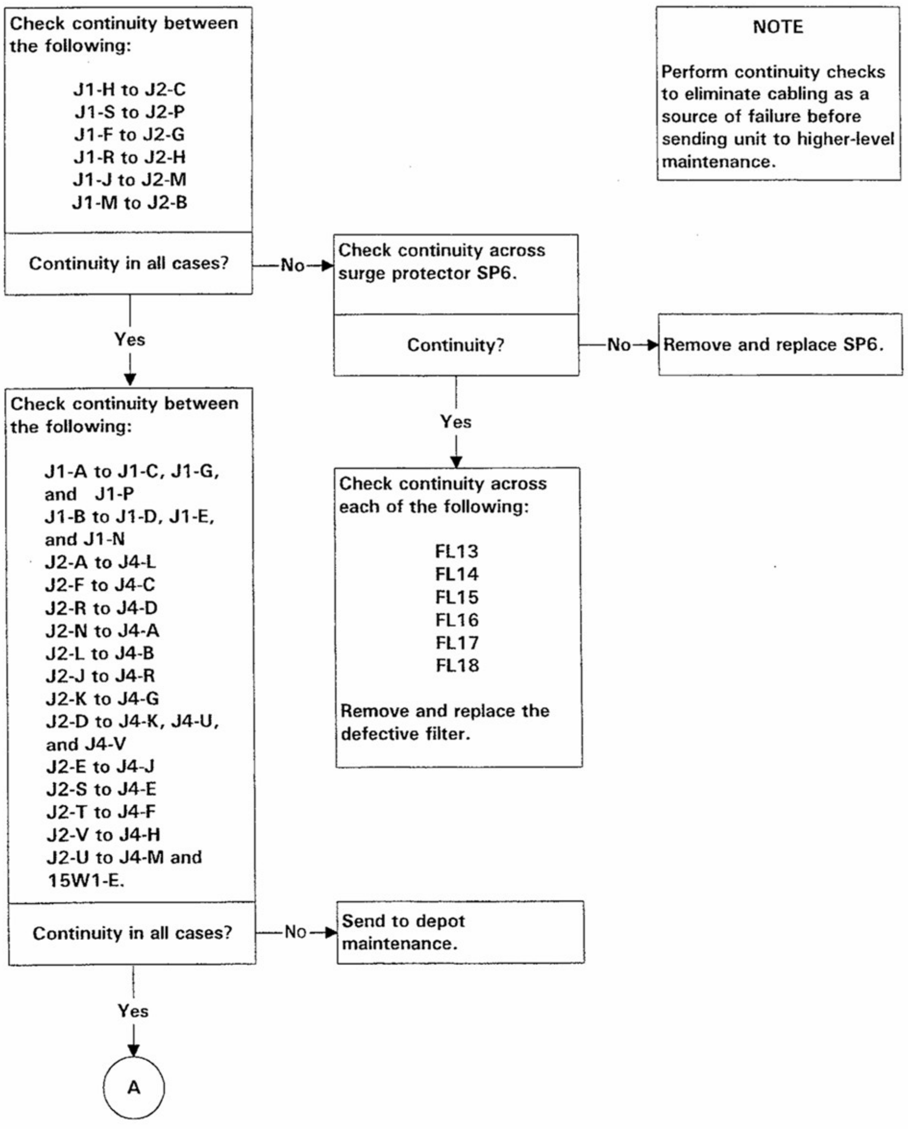
None

Conditions

Signal entry box removed from shelter.

Drawings

Figure FO-3, Signal Entry Box Schematic

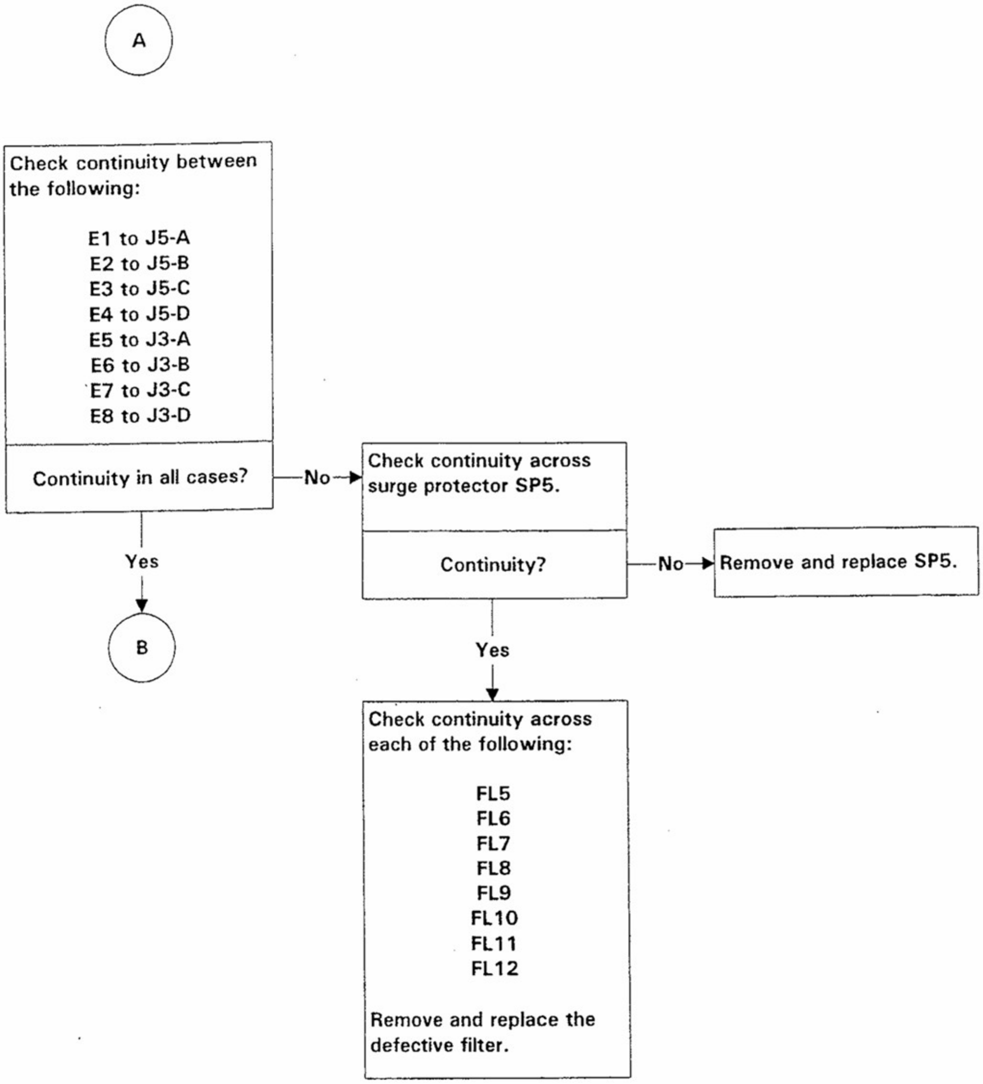

Check continuity between the following:
J1-H to J2-C
J1-S to J2-P
J1-F to J2-G
J1-R to J2-H
J1-J to J2-M
J1-M to J2-B
Continuity in all cases?
No
Check continuity across surge protector SP6.
Continuity?
No
Remove and replace SP6.
Yes
Yes
NOTE
Perform continuity checks to eliminate cabling as a source of failure before sending unit to higher-level maintenance.
Check continuity between the following:
J1-A to J1-C, J1-G, and J1-P
J1-B to J1-D, J1-E, and J1-N
J2-A to J4-L
J2-F to J4-C
J2-R to J4-D
J2-N to J4-A
J2-L to J4-B
J2-J to J4-R
J2-K to J4-G
J2-D to J4-K, J4-U, and J4-V
J2-E to J4-J
J2-S to J4-E
J2-T to J4-F
J2-V to J4-H
J2-U to J4-M and 15W1-E.
Check continuity across each of the following:
FL13
FL14
FL15
FL16
FL17
FL18
Remove and replace the defective filter.
Continuity in all cases?
No
Send to depot maintenance.
Yes
A

Signal Entry Box troubleshooting flowchart

4-7. SIGNAL ENTRY BOX

Troubleshoot and test signal entry box

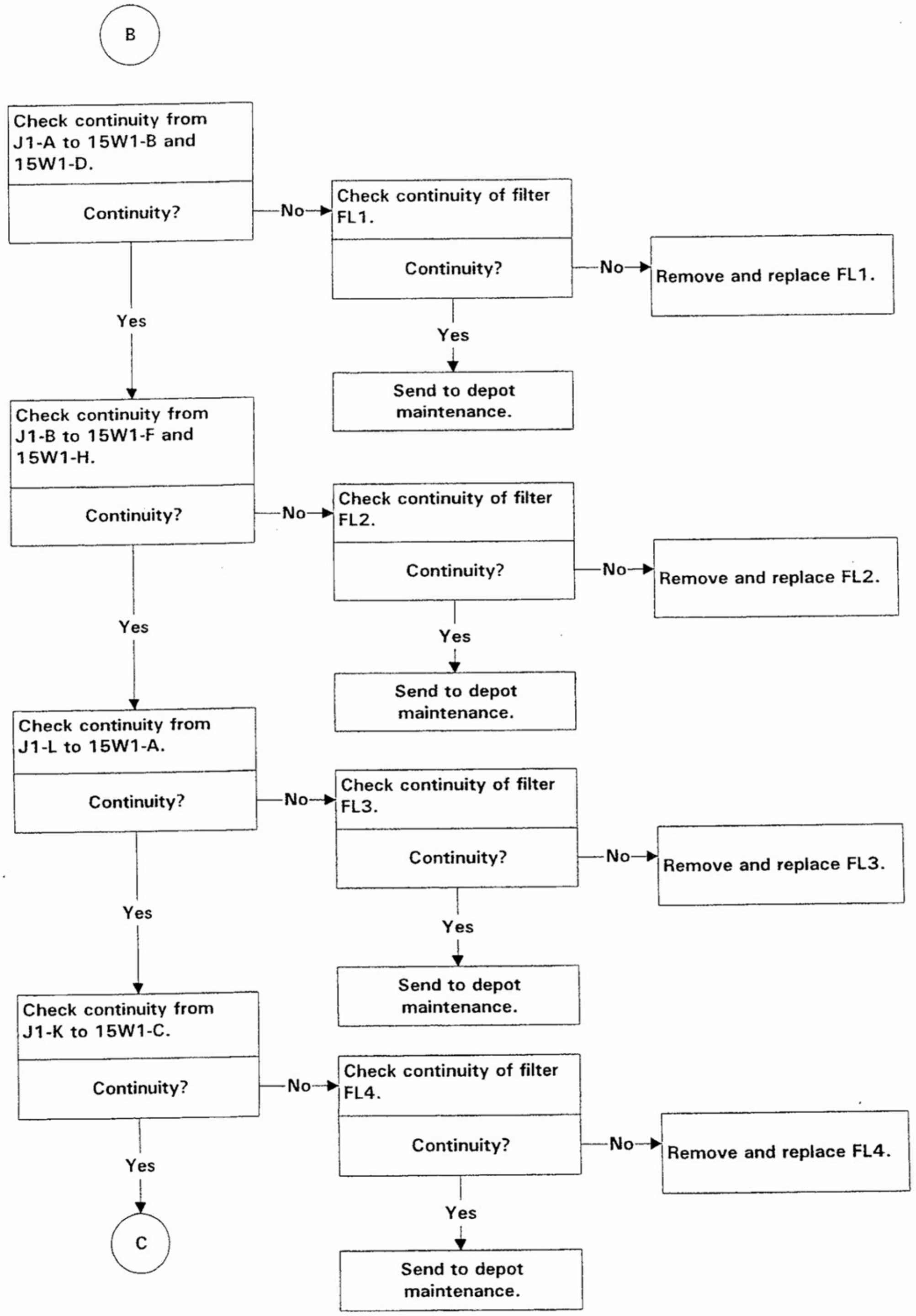
(Sheet 2 of 6)


A
Check continuity between the following:
E1 to J5-A
E2 to J5-B
E3 to J5-C
E4 to J5-D
E5 to J3-A
E6 to J3-B
E7 to J3-C
E8 to J3-D
Continuity in all cases?
Yes
B
No
Check continuity across surge protector SP5.
Continuity?
No
Remove and replace SP5.
Yes
Check continuity across each of the following:
FL5
FL6
FL7
FL8
FL9
FL10
FL11
FL12
Remove and replace the defective filter.

Signal Entry Box troubleshooting flowchart

4-7. SIGNAL ENTRY BOX
Troubleshoot and test signal entry box

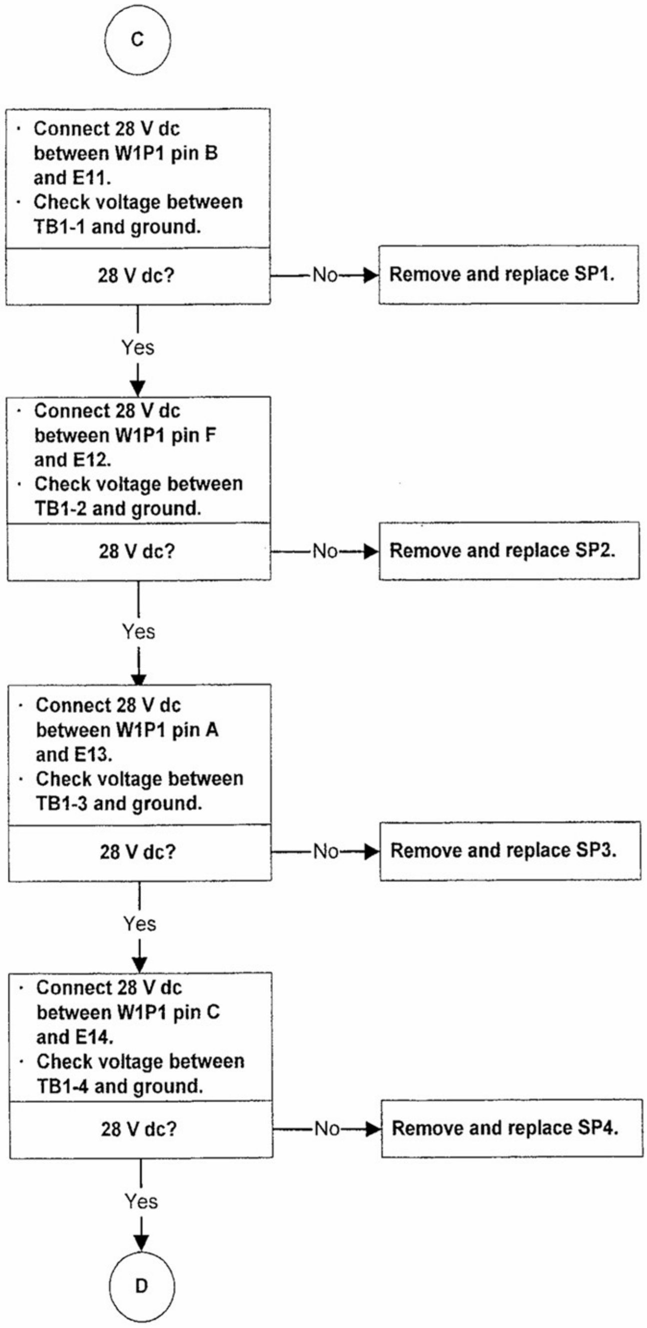
(Sheet 3 of 6)


B
Check continuity from J1-A to 15W1-B and 15W1-D.
Continuity?
No
Check continuity of filter FL1.
Continuity?
No
Remove and replace FL1.
Yes
Send to depot maintenance.
Yes
Check continuity from J1-B to 15W1-F and 15W1-H.
Continuity?
No
Check continuity of filter FL2.
Continuity?
No
Remove and replace FL2.
Yes
Send to depot maintenance.
Yes
Check continuity from J1-L to 15W1-A.
Continuity?
No
Check continuity of filter FL3.
Continuity?
No
Remove and replace FL3.
Yes
Send to depot maintenance.
Yes
Check continuity from J1-K to 15W1-C.
Continuity?
No
Check continuity of filter FL4.
Continuity?
No
Remove and replace FL4.
Yes
Send to depot maintenance.
Yes
C

Signal Entry Box troubleshooting flowchart

4-7. SIGNAL ENTRY BOX

Troubleshoot and test signal entry box (Sheet 4 of 6)

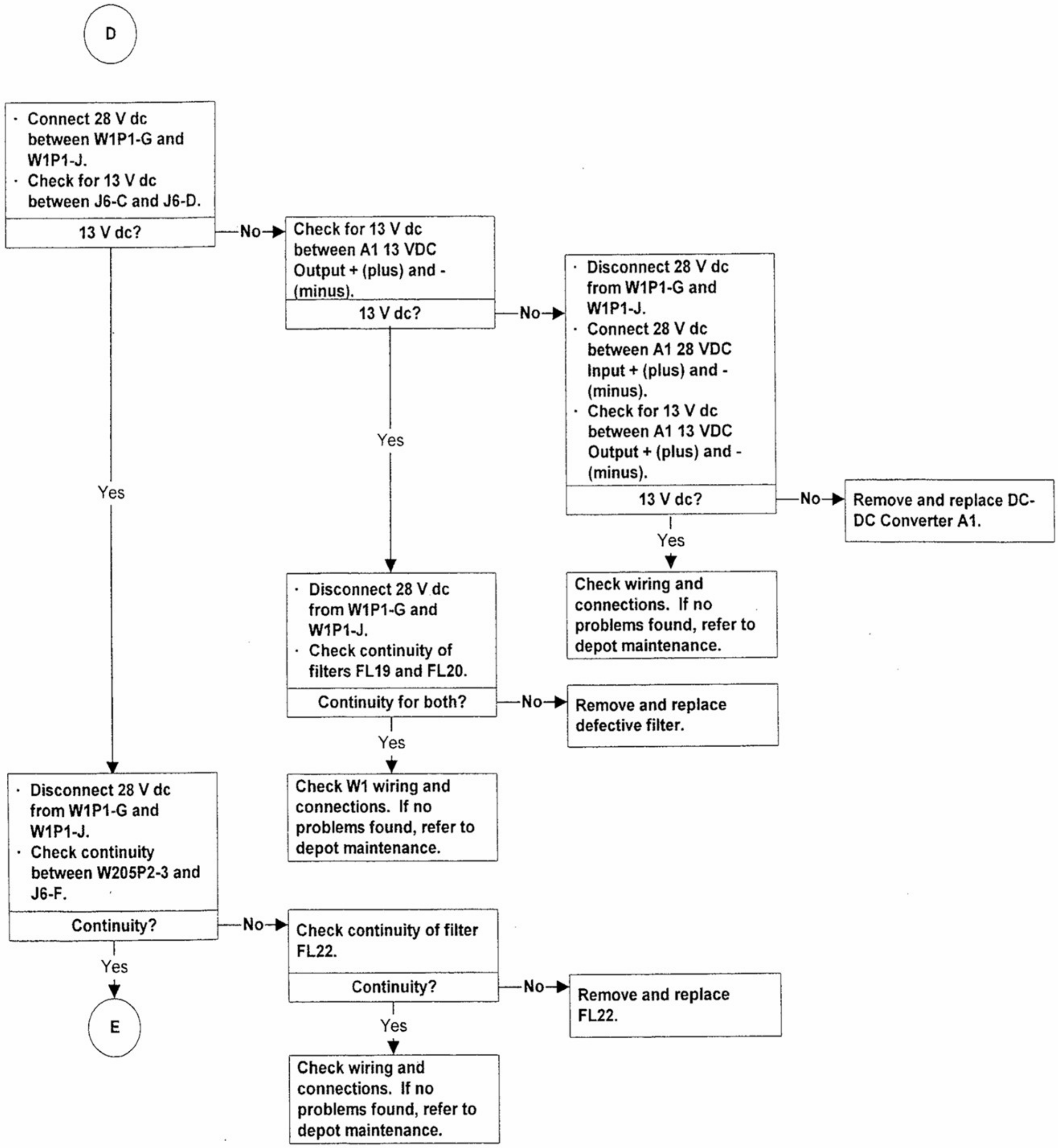

C
· Connect 28 V dc between W1P1 pin B and E11.
· Check voltage between TB1-1 and ground.
28 V dc?
No
Remove and replace SP1.
Yes
· Connect 28 V dc between W1P1 pin F and E12.
· Check voltage between TB1-2 and ground.
28 V dc?
No
Remove and replace SP2.
Yes
· Connect 28 V dc between W1P1 pin A and E13.
· Check voltage between TB1-3 and ground.
28 V dc?
No
Remove and replace SP3.
Yes
· Connect 28 V dc between W1P1 pin C and E14.
· Check voltage between TB1-4 and ground.
28 V dc?
No
Remove and replace SP4.
Yes
D

Signal Entry Box troubleshooting flowchart

4-7. SIGNAL ENTRY BOX

Troubleshoot and test signal entry box

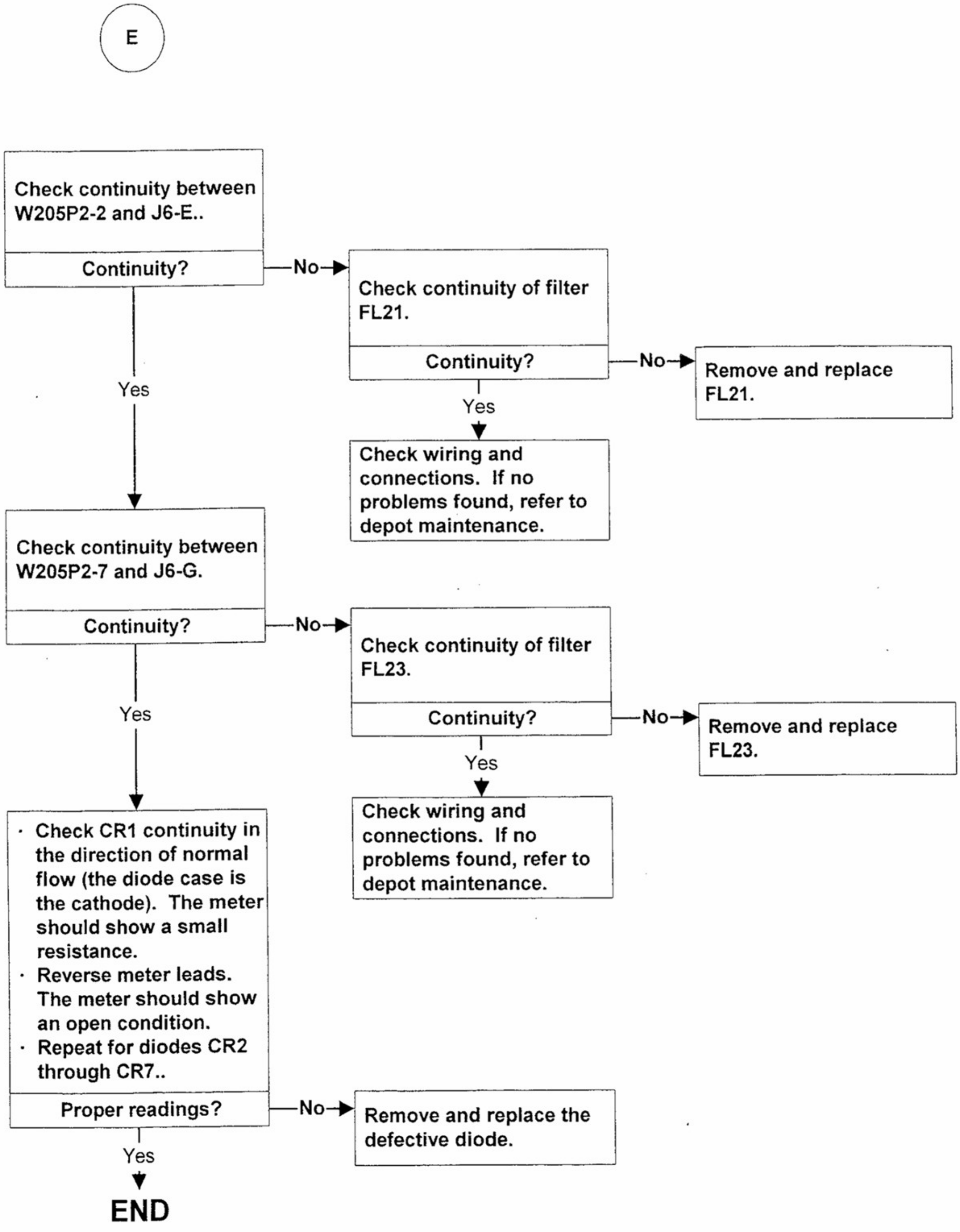
(Sheet 5 of 6)


D
· Connect 28 V dc between W1P1-G and W1P1-J.
· Check for 13 V dc between J6-C and J6-D.
13 V dc?
No
Check for 13 V dc between A1 13 VDC Output + (plus) and - (minus).
13 V dc?
No
· Disconnect 28 V dc from W1P1-G and W1P1-J.
· Connect 28 V dc between A1 28 VDC Input + (plus) and - (minus).
· Check for 13 V dc between A1 13 VDC Output + (plus) and - (minus).
13 V dc?
No
Remove and replace DC-DC Converter A1.
Yes
Check wiring and connections. If no problems found, refer to depot maintenance.
Yes
· Disconnect 28 V dc from W1P1-G and W1P1-J.
· Check continuity of filters FL19 and FL20.
Continuity for both?
No
Remove and replace defective filter.
Yes
Check W1 wiring and connections. If no problems found, refer to depot maintenance.
Yes
· Disconnect 28 V dc from W1P1-G and W1P1-J.
· Check continuity between W205P2-3 and J6-F.
Continuity?
No
Check continuity of filter FL22.
Continuity?
No
Remove and replace FL22.
Yes
Check wiring and connections. If no problems found, refer to depot maintenance.
Yes
E

Signal Entry Box troubleshooting flowchart

4-7. SIGNAL ENTRY BOX
Troubleshoot and test signal entry box

(Sheet 6 of 6)


E
Check continuity between W205P2-2 and J6-E..
Continuity?
No
Check continuity of filter FL21.
Continuity?
No
Remove and replace FL21.
Yes
Check wiring and connections. If no problems found, refer to depot maintenance.
Yes
Check continuity between W205P2-7 and J6-G.
Continuity?
No
Check continuity of filter FL23.
Continuity?
No
Remove and replace FL23.
Yes
Check wiring and connections. If no problems found, refer to depot maintenance.
Yes
· Check CR1 continuity in the direction of normal flow (the diode case is the cathode). The meter should show a small resistance.
· Reverse meter leads. The meter should show an open condition.
· Repeat for diodes CR2 through CR7..
Proper readings?
No
Remove and replace the defective diode.
Yes
END

System troubleshooting flowchart

3-37. SYSTEM POWER FAULT

When AC primary input power is used.

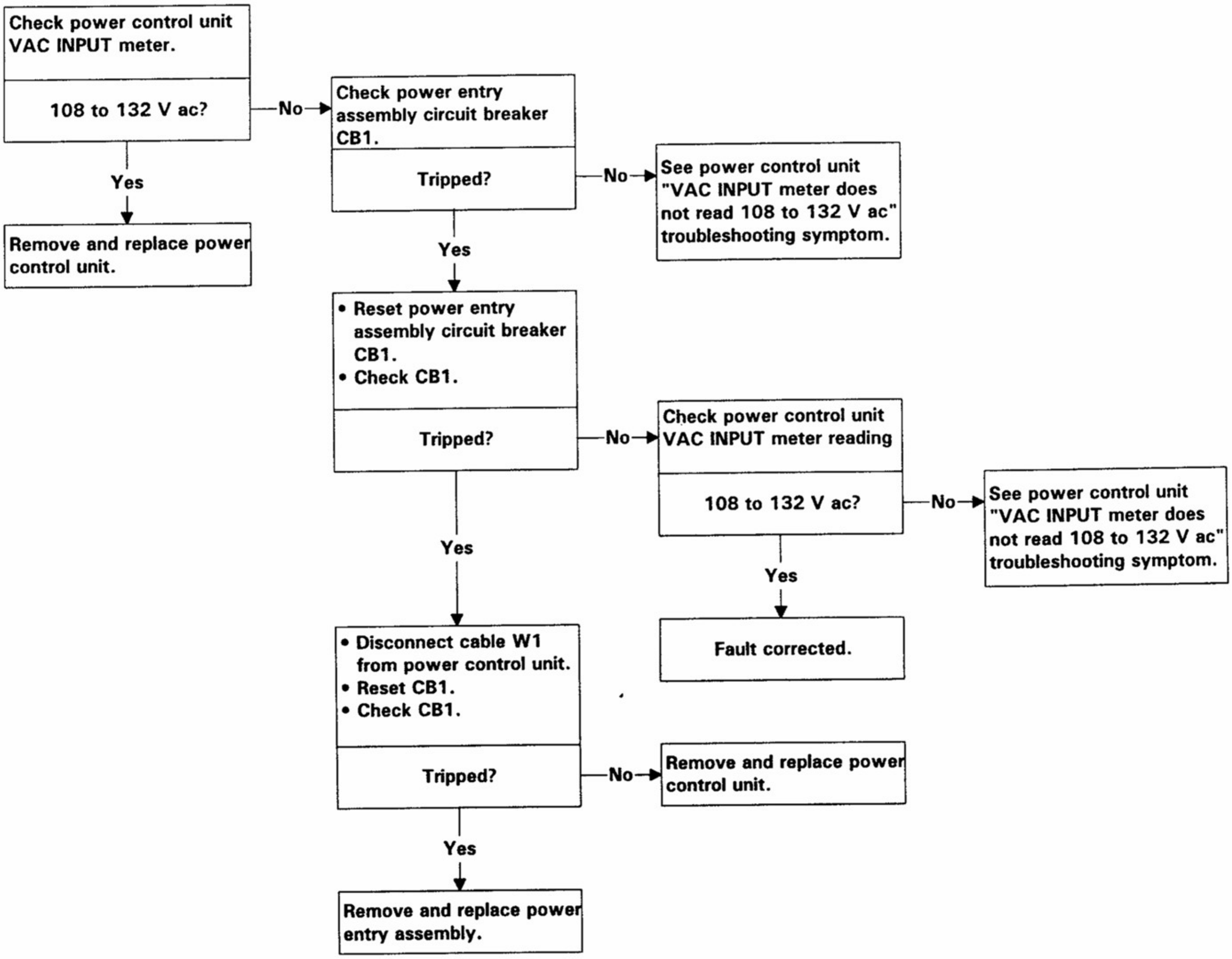
(Sheet 1 of 1)

INITIAL SETUP

Test Equipment
Multimeter

Tools and Special Tools
None

Conditions
No shelter equipment operates.
Verified 230 V ac power source connected to power entry assembly 1J1.


Check power control unit VAC INPUT meter.
108 to 132 V ac?
Yes
Remove and replace power control unit.
No
Check power entry assembly circuit breaker CB1.
Tripped?
No
See power control unit "VAC INPUT meter does not read 108 to 132 V ac" troubleshooting symptom.
Yes
• Reset power entry assembly circuit breaker CB1.
• Check CB1.
Tripped?
No
Check power control unit VAC INPUT meter reading
108 to 132 V ac?
No
See power control unit "VAC INPUT meter does not read 108 to 132 V ac" troubleshooting symptom.
Yes
Fault corrected.
Yes
• Disconnect cable W1 from power control unit.
• Reset CB1.
• Check CB1.
Tripped?
No
Remove and replace power control unit.
Yes
Remove and replace power entry assembly.

System troubleshooting flowchart

3-38. SYSTEM POWER FAULT

When DC primary input power is used.

(Sheet 1 of 1)

INITIAL SETUP

Test Equipment
Multimeter

Tools and Special Tools
None

Conditions

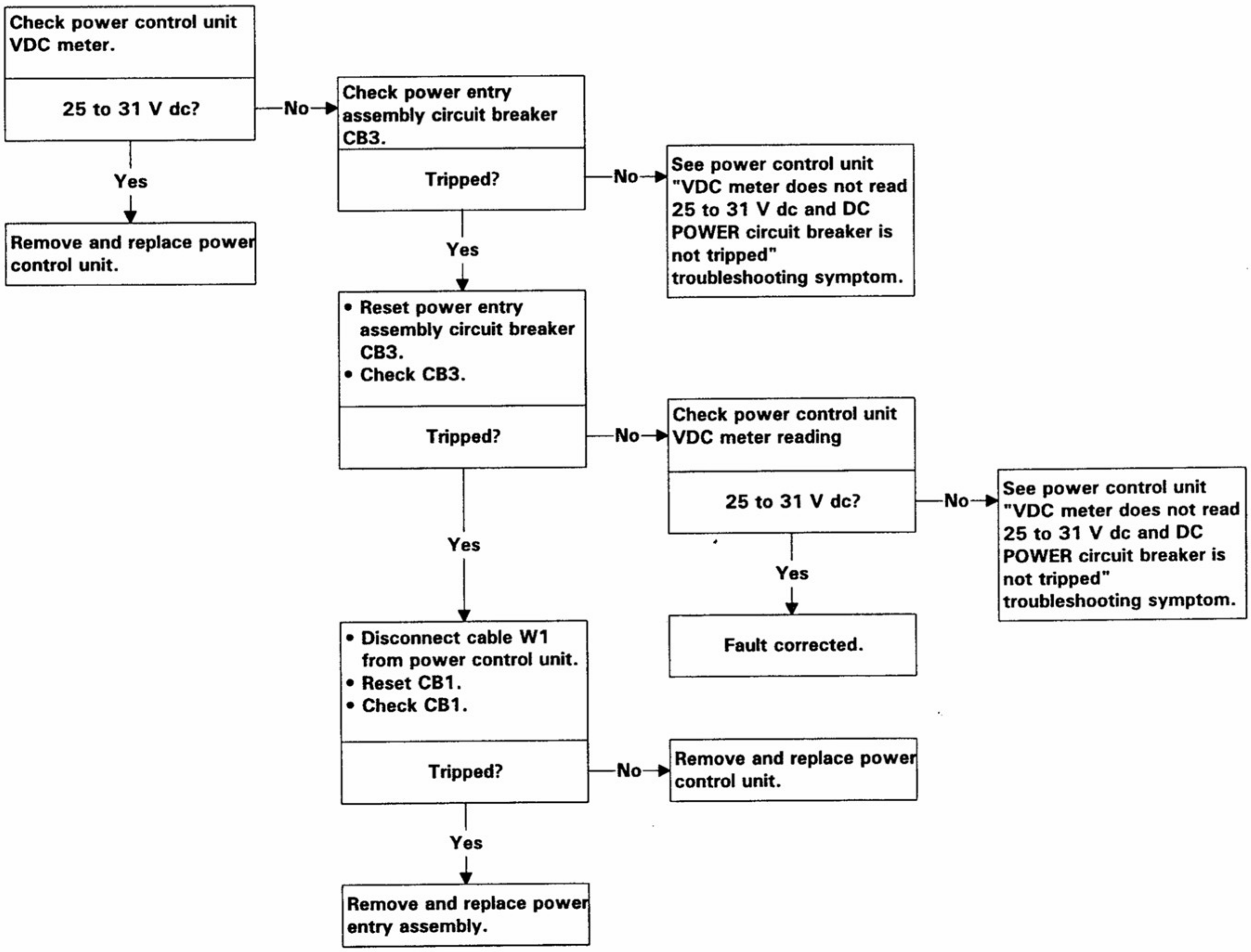
No shelter equipment operates.

Verified 28 V dc power source connected to 1J3, 230 V ac not connected to 1J1.

Power control unit POWER SUPPLY switch set to VEHICLE.

Power control unit AC OPERATE/DC OPERATE/RESET switch set to DC OPERATE.

Power control unit DC POWER circuit breaker not tripped.


Check power control unit VDC meter.
25 to 31 V dc?
Yes
Remove and replace power control unit.
No
Check power entry assembly circuit breaker CB3.
Tripped?
No
See power control unit "VDC meter does not read 25 to 31 V dc and DC POWER circuit breaker is not tripped" troubleshooting symptom.
Yes
• Reset power entry assembly circuit breaker CB3.
• Check CB3.
Tripped?
No
Check power control unit VDC meter reading
25 to 31 V dc?
No
See power control unit "VDC meter does not read 25 to 31 V dc and DC POWER circuit breaker is not tripped" troubleshooting symptom.
Yes
Fault corrected.
Yes
• Disconnect cable W1 from power control unit.
• Reset CB1.
• Check CB1.
Tripped?
No
Remove and replace power control unit.
Yes
Remove and replace power entry assembly.

System troubleshooting flowchart

3-11. LIGHTWEIGHT COMPUTER UNIT

LCU does not operate.

(Sheet 1 of 2)

INITIAL SETUP

Test Equipment

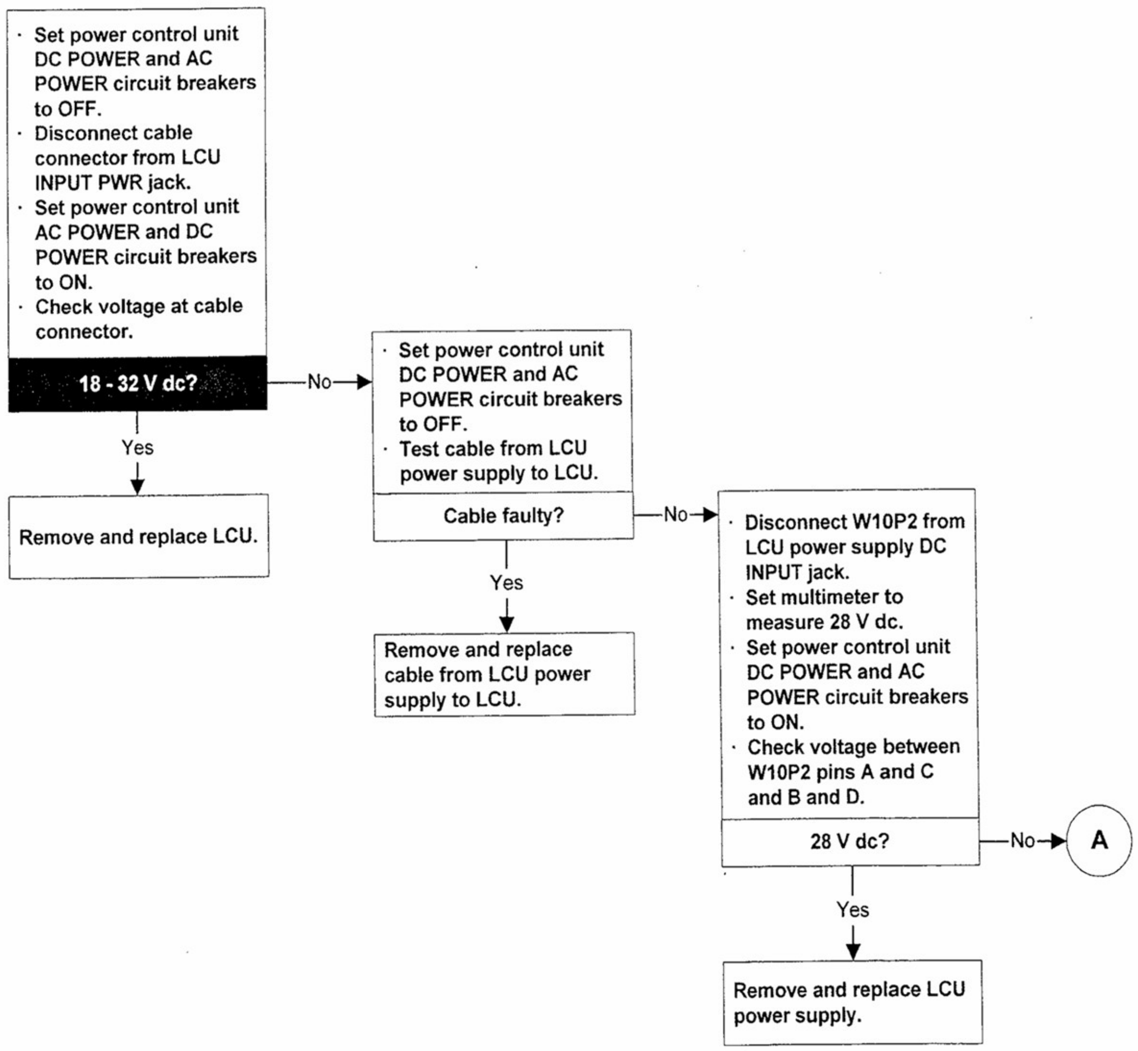
Multimeter

Tools and Special Tools

None

Conditions

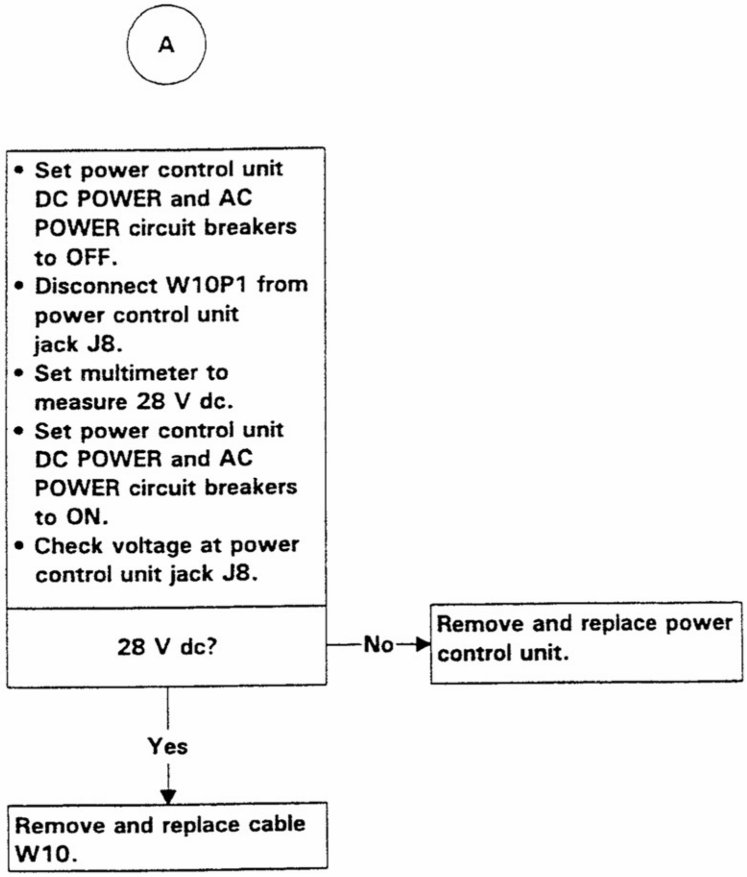
1. Verified 240 V ac connected to power entry assembly 1J1 or 28 V dc power source connected to power entry assembly 1J3.
2. Power control unit VDC meter reads 25 to 31 V dc. If not, go to "VDC meter does not read 25 to 31 V dc" troubleshooting procedure.


· Set power control unit DC POWER and AC POWER circuit breakers to OFF.
· Disconnect cable connector from LCU INPUT PWR jack.
· Set power control unit AC POWER and DC POWER circuit breakers to ON.
· Check voltage at cable connector.
18 - 32 V dc?
Yes
Remove and replace LCU.
No
· Set power control unit DC POWER and AC POWER circuit breakers to OFF.
· Test cable from LCU power supply to LCU.
Cable faulty?
Yes
Remove and replace cable from LCU power supply to LCU.
No
· Disconnect W10P2 from LCU power supply DC INPUT jack.
· Set multimeter to measure 28 V dc.
· Set power control unit DC POWER and AC POWER circuit breakers to ON.
· Check voltage between W10P2 pins A and C and B and D.
28 V dc?
Yes
Remove and replace LCU power supply.
No
A

3-11. LIGHTWEIGHT COMPUTER UNIT

LCU does not operate.

(Sheet 2 of 2)



- Set power control unit DC POWER and AC POWER circuit breakers to OFF.
- Disconnect W10P1 from power control unit jack J8.
- Set multimeter to measure 28 V dc.
- Set power control unit DC POWER and AC POWER circuit breakers to ON.
- Check voltage at power control unit jack J8.

28 V dc?

Remove and replace power control unit.

Remove and replace cable W10.

System troubleshooting flowchart

3-12. LIGHTWEIGHT COMPUTER UNIT

LCU error/status messages.

(Sheet 1 of 1)

INITIAL SETUP

Test Equipment
None

Tools and Special Tools
None

Conditions
System powered up and operating.

For the AN/TMQ-41A, some LCU error/status messages and/or other signs indicate that the LCU hard drive needs to be reformatted and/or the MMS software needs to be restored to the hard drive. These error/status messages or signs consist of the following:

UNABLE TO RESTORE DATABASE
Hard disk errors, for example at power on.
Inability of the LCU to boot.

If one of these indications occurs, use the CD ROM drive assembly, boot disk, and MMS V11.006 CD to reformat the LCU hard drive and reload the MMS software (see appendix M).

For either the AN/TMQ-41 or the AN/TMQ-41A, some LCU error/status messages can provide an indication that the LCU should be removed and replaced. These error/status messages consist of the following:

MESSAGE NOT TRANSMITTED - COMM CHANNEL FAULT
MESSAGE NOT TRANSMITTED - TCIM INTERFACE FAILURE
MESSAGE NOT TRANSMITTED - TCIM PROCESSOR HAS FAILED
TCIM INTERFACE FAILURE - CHANNEL...
TCIM INTERFACE FAILURE - TO USE TCIM, SHUTDOWN AND RESTART LCU
TCIM LOAD COMPLETE - CHANNEL ... FAILED TO LOAD
TCIM LOAD FAILED
UNABLE TO RESTORE DATABASE
UNABLE TO SAVE A RECEIVED MESSAGE IN THE DATABASE

If one of these messages occurs repeatedly, remove and replace the LCU.

System troubleshooting flowchart

3-39. CD ROM DRIVE

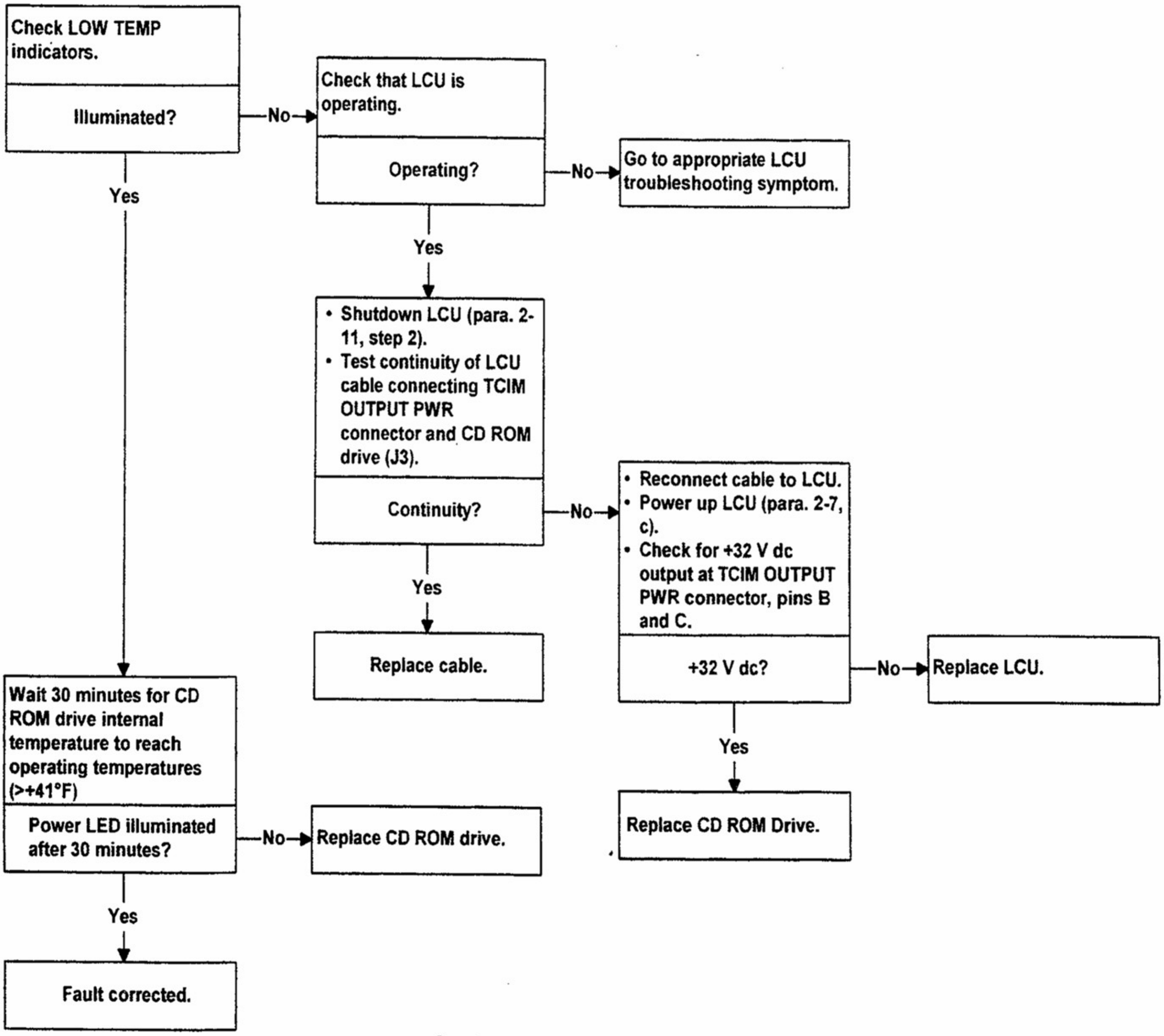
POWER LED does not illuminate. (Sheet 1 of 1)

INITIAL SETUP

Test Equipment
Multimeter

Tools and Special Tools
None

Conditions
LCU powered up.
CD ROM drive powered up.


Check LOW TEMP indicators.
Illuminated?
No
Yes
Check that LCU is operating.
Operating?
No
Go to appropriate LCU troubleshooting symptom.
Yes
• Shutdown LCU (para. 2-11, step 2).
• Test continuity of LCU cable connecting TCIM OUTPUT PWR connector and CD ROM drive (J3).
Continuity?
No
Yes
Replace cable.
• Reconnect cable to LCU.
• Power up LCU (para. 2-7, c).
• Check for +32 V dc output at TCIM OUTPUT PWR connector, pins B and C.
+32 V dc?
No
Replace LCU.
Yes
Replace CD ROM Drive.
Wait 30 minutes for CD ROM drive internal temperature to reach operating temperatures (>+41°F)
Power LED illuminated after 30 minutes?
No
Replace CD ROM drive.
Yes
Fault corrected.

System troubleshooting flowchart

3-10. FAN

Fan does not operate

(Sheet 1 of 1)

INITIAL SETUP

Test Equipment

Multimeter

Tools and Special Tools

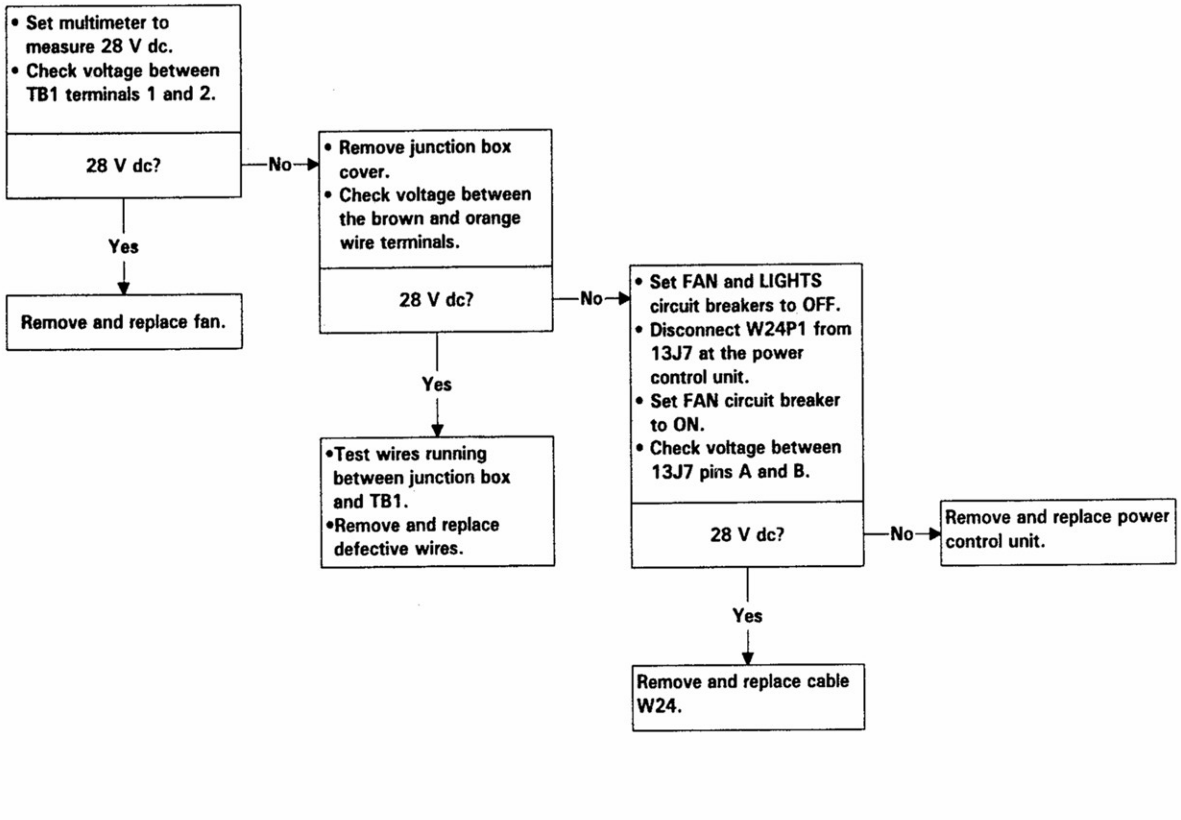
1/8 inch flat-tip screwdriver

Conditions

1. Verified 240 V ac or 28 V dc power source connected to power entry assembly 1J1.
2. AC POWER and DC POWER circuit breakers set to ON.
3. Other shelter equipment operating properly.
4. Fan enclosure removed in accordance with paragraph 3-52, REMOVAL, steps 1 and 2.

WARNING

Before you disconnect or test cables, ensure that power control unit FAN circuit breaker is OFF.


• Set multimeter to measure 28 V dc.
• Check voltage between TB1 terminals 1 and 2.
28 V dc?
Yes
Remove and replace fan.
No
• Remove junction box cover.
• Check voltage between the brown and orange wire terminals.
28 V dc?
Yes
•Test wires running between junction box and TB1.
•Remove and replace defective wires.
No
• Set FAN and LIGHTS circuit breakers to OFF.
• Disconnect W24P1 from 13J7 at the power control unit.
• Set FAN circuit breaker to ON.
• Check voltage between 13J7 pins A and B.
28 V dc?
No
Remove and replace power control unit.
Yes
Remove and replace cable W24.

System troubleshooting flowchart

3-30. RADIOS

Radios do not operate.

(Sheet 1 of 1)

INITIAL SETUP

Test Equipment

Multimeter

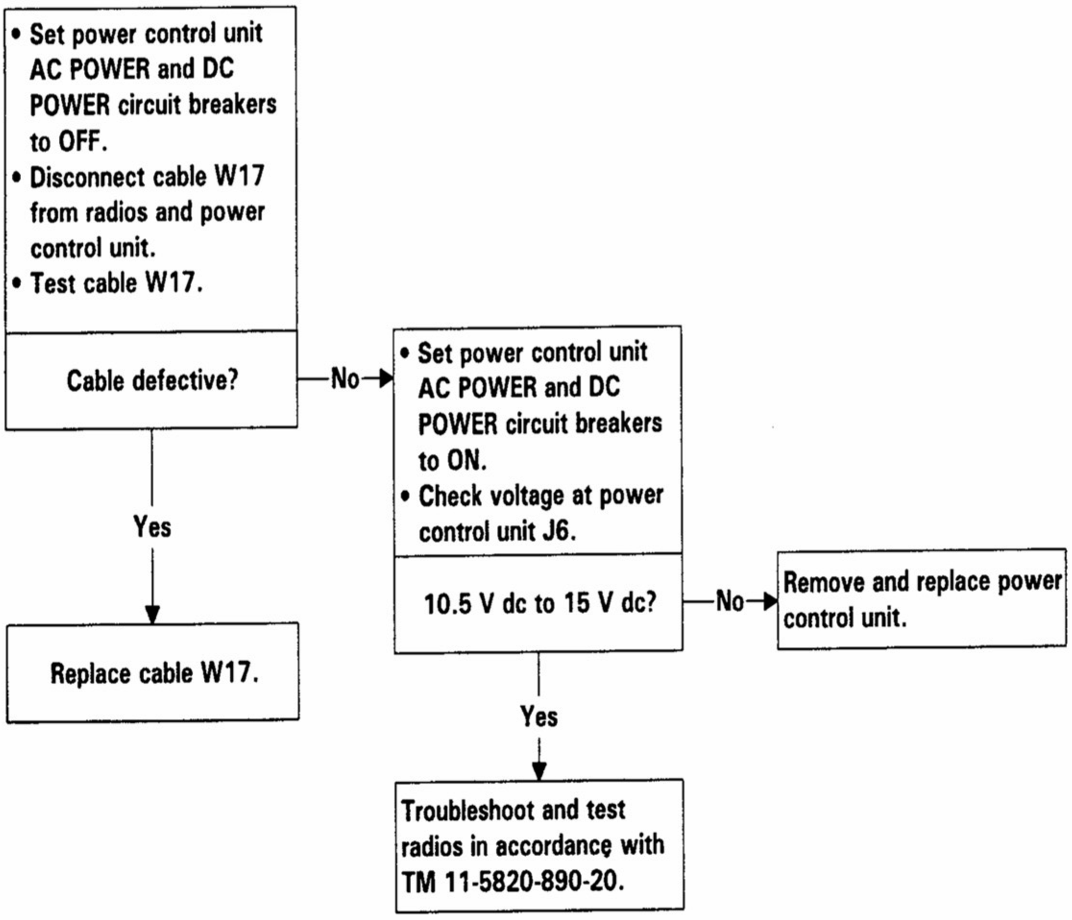
Tools and Special Tools

None

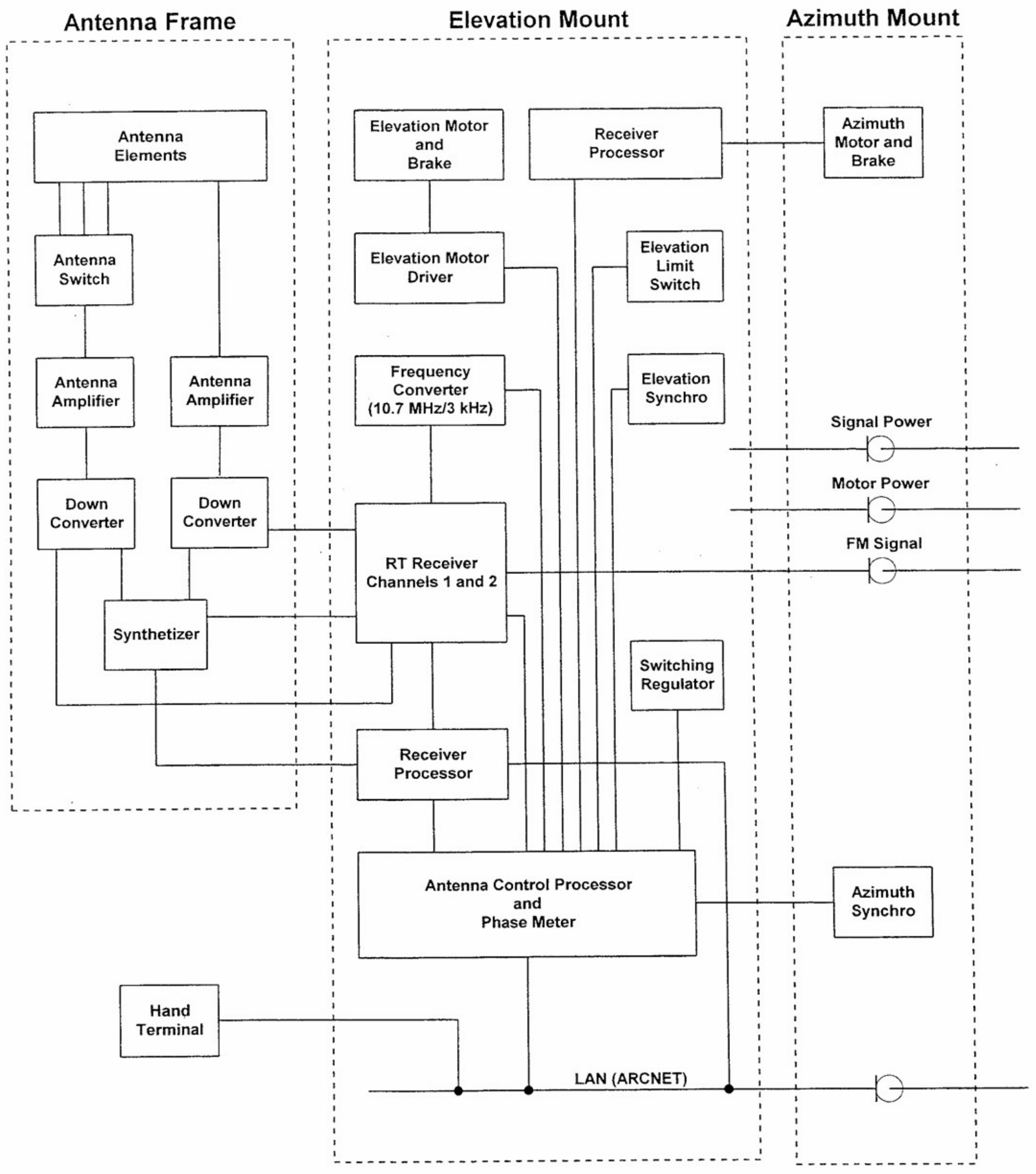
Conditions

MMS operating from verified 230 V ac or 28 V dc power source.

Other MMS equipment operating properly.

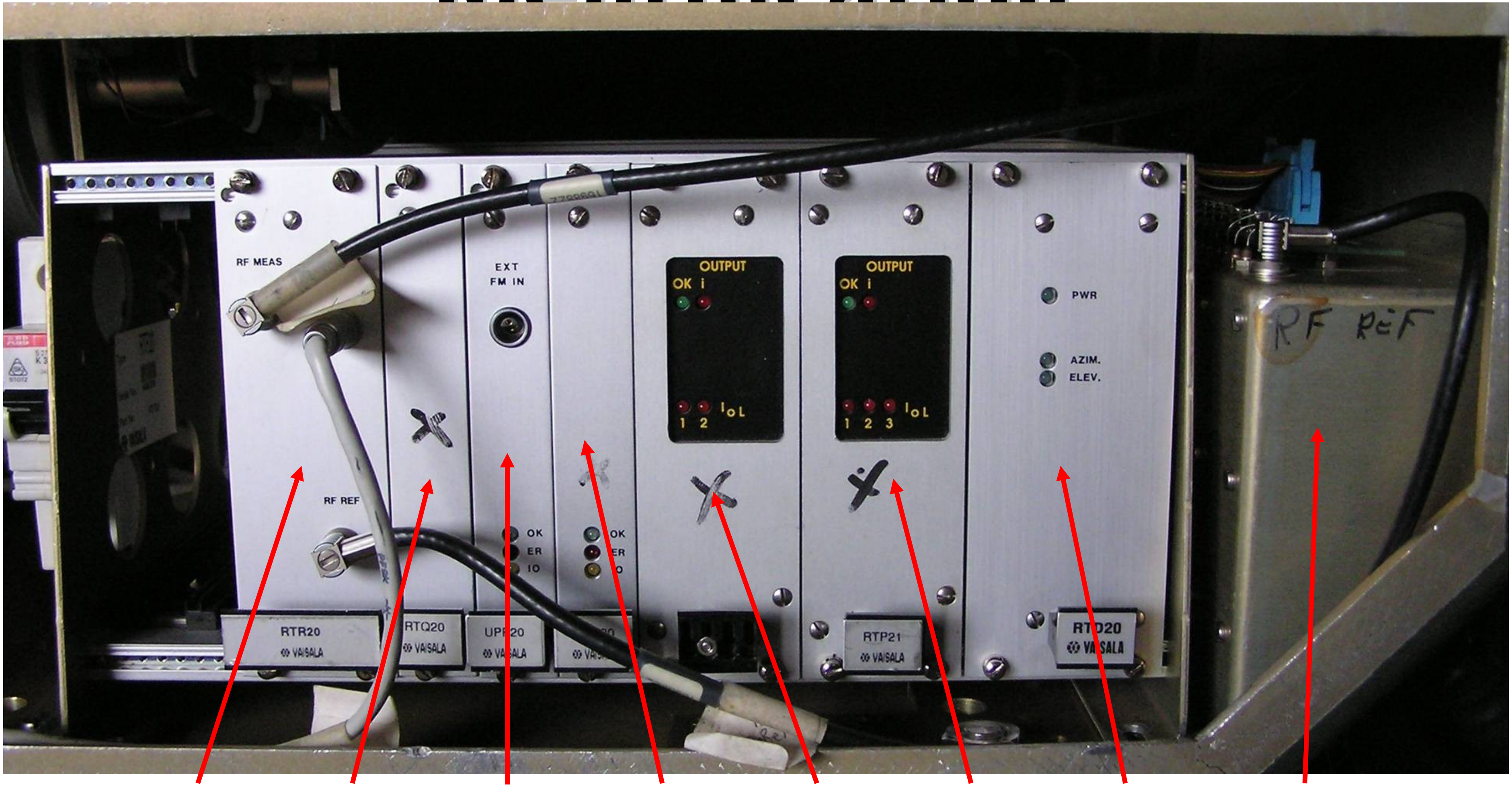

• Set power control unit AC POWER and DC POWER circuit breakers to OFF.
• Disconnect cable W17 from radios and power control unit.
• Test cable W17.
Cable defective?
Yes
Replace cable W17.
No
• Set power control unit AC POWER and DC POWER circuit breakers to ON.
• Check voltage at power control unit J6.
10.5 V dc to 15 V dc?
No
Remove and replace power control unit.
Yes
Troubleshoot and test radios in accordance with TM 11-5820-890-20.

RDF Block Diagram


Antenna Frame
Elevation Mount
Azimuth Mount
Antenna Elements
Antenna Switch
Antenna Amplifier
Antenna Amplifier
Down Converter
Down Converter
Synthetizer
Elevation Motor and Brake
Receiver Processor
Azimuth Motor and Brake
Elevation Motor Driver
Elevation Limit Switch
Frequency Converter (10.7 MHz/3 kHz)
Elevation Synchro
Signal Power
Motor Power
FM Signal
RT Receiver Channels 1 and 2
Switching Regulator
Receiver Processor
Antenna Control Processor and Phase Meter
Azimuth Synchro
Hand Terminal
LAN (ARCNET)

RDF Antenna Block Diagram.

RDF card location & identification


RF MEAS
RF REF
EXT
FM IN
OK
ER
IO
OUTPUT
OK i
1 2
IOL
1 2 3
PWR
AZIM.
ELEV.
RTR20
VAISALA
RTQ20
UPP20
RTP21
RTD20
RF REF

RTR20 RTQ20 UPP20 RTC20 RTP20 RTP21 RTD20 I/O panel

RTC20 Control processor

- The RTC20 controls the motor drivers and antenna switches, measures the antenna’s mechanical and electrical angles as well as watches over the system’s functions.
- Schematics are located in the TM 10103A-23/4-3

RTR20 RT Receiver

- The RTR20 operations are controlled by the UPP20.
- 2 403MHZ input signals come from the RTX20.
- Both channels are identical, they get amplified and converted to 10.7MHZ. It then gets filtered and exit the unit as “PH1REF” and “PH1MEAS” which are used for phase measurements.
- Schematics are located in the TM 10103A-23/4-3

URR20 Receiver unit

- The URR20 is a radiosonde receiver operating at UHF band at 400 to 406 MHZ frequencies.
- The UPP20 controls the functions of the URR20 which receives radiosonde signals from the directional UHF antenna.
- The omni-directional UHF antenna can be used with this card also.
- Schematics are located in the TM 10103A-23/4-3

UPP20 Processor unit

- The UPP20 is a control processor for the URR20 which receives radiosonde signals at meteorological band 400 to 406 MHZ..
- The UPP20 can be controlled through serial line or via ARCNET type Local Area Network.
- In addition to controlling the URR20 receiver functions the UPP20 includes capabilities of measuring the radiosonde and special sensor signals.
- It also has a provision for receiving signals from future digital radiosonde.
- Schematics are located in the TM 10103A-23/4-3

RTD20 Motor driver

- The RTD20 unit includes drivers for azimuth and elevation DC-motors, brake control circuits, and a synchro reference voltage sensor.
- All data and control to and from the unit is made by the Control Processor.
- The three LED’s in the front panel indicate the presence of the motor’s feeding voltage and motor driver’s operation.
- Schematics are located in the TM 10103A-23/5-1

RTP20 & RTP21 Power supplies

- The RTP20 and RTP21 power supply units are isolated DC/DC converters to generate the feeding voltages needed by the electronics.
- Both power supplies are similar except different outputs.
- The LED’s is the front panel allow the monitoring of the converter’s status
- The RTP20 has two outputs of 15V at 1.7A.
- The RTP21 has two output voltages of 12V at .7A, and one output of 5.1V at 5A.
- Schematics are located in the TM 10103A-23/5-1

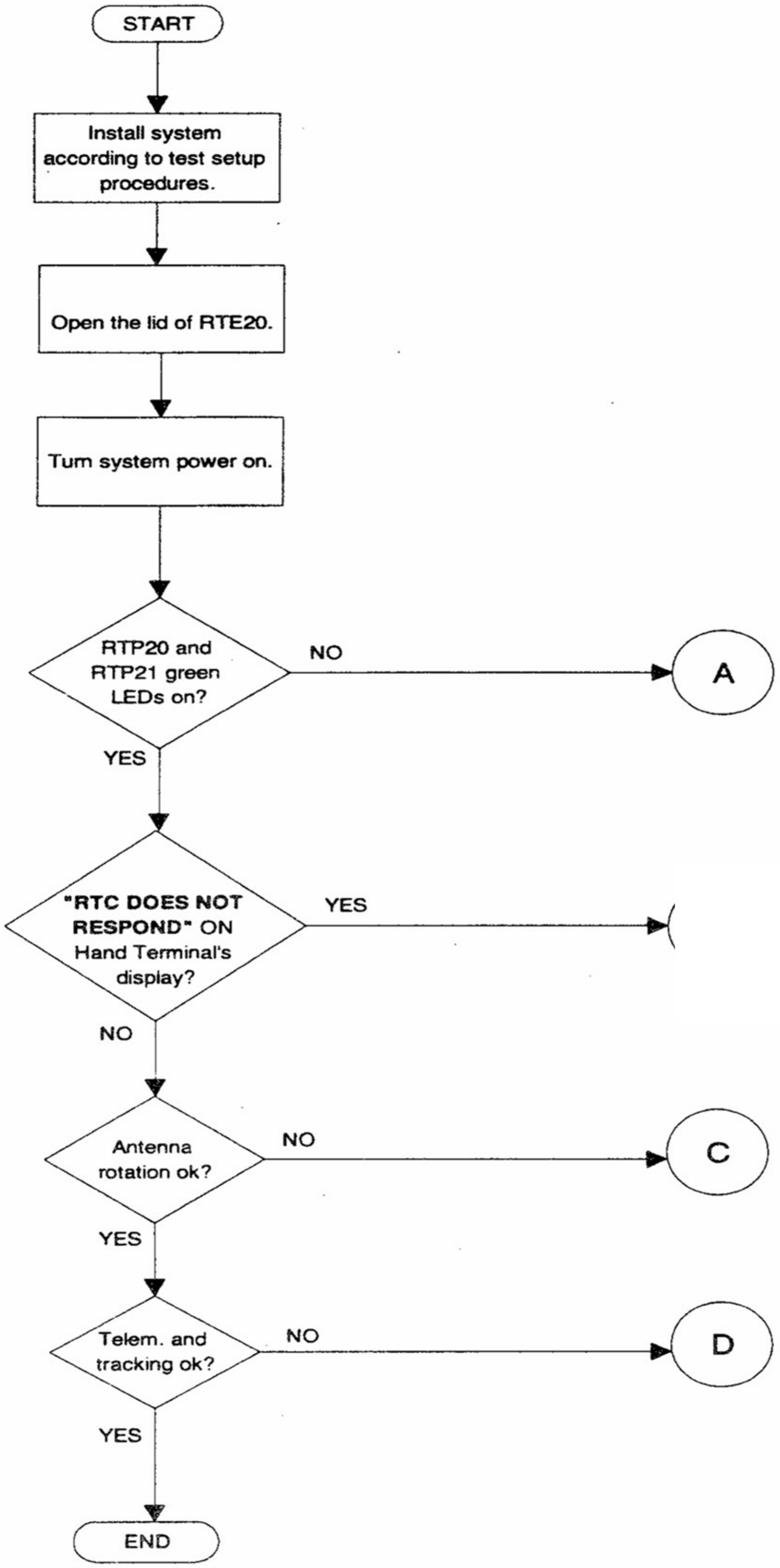
RTQ20 Frequency converter

o The RTQ20 contains two down-converters that shift the frequency of the two incoming 10.7 MHZ IF signals (from the RTR20) to a lower frequency and perform an analog multiplication between them.

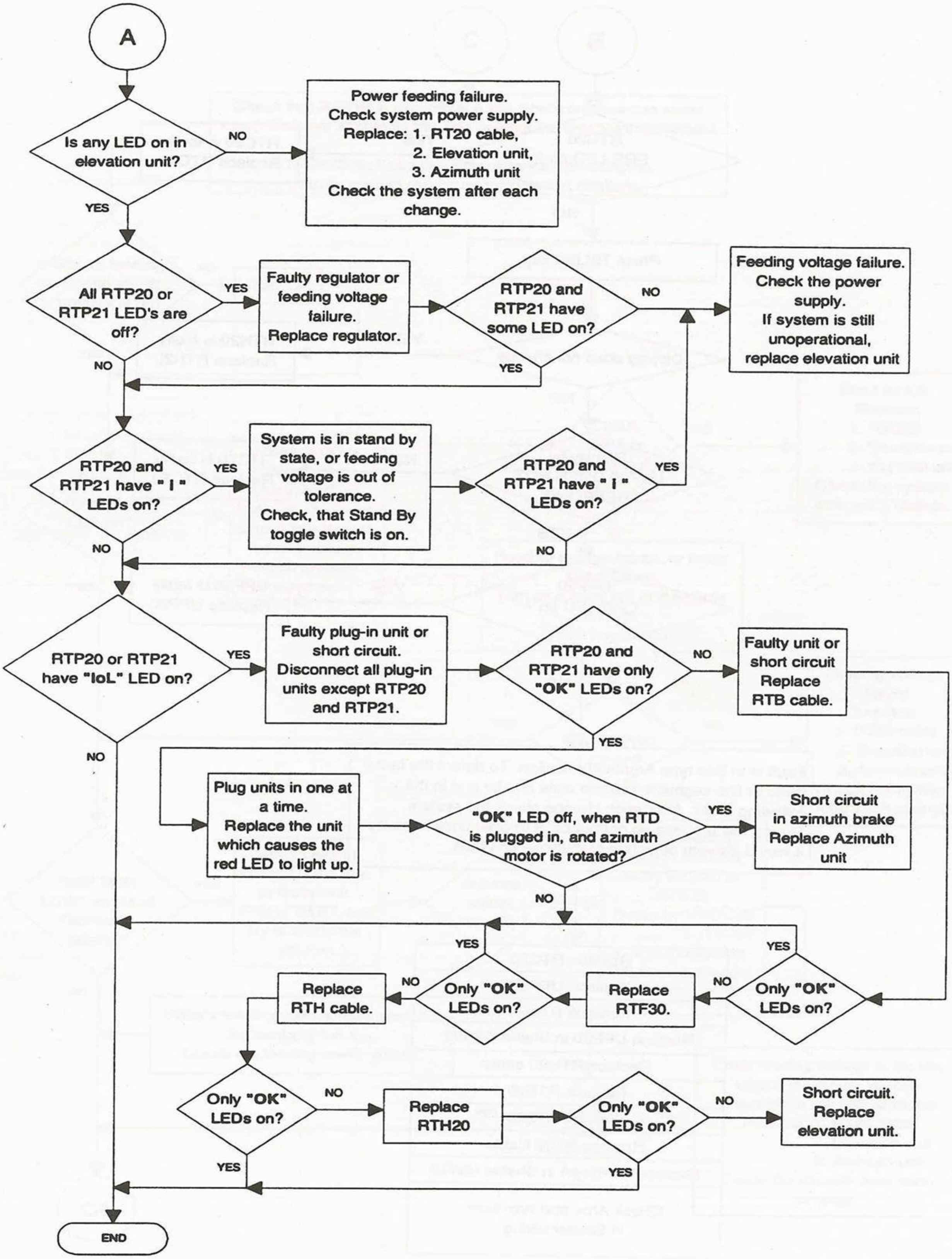
o This process results in a 3 KHZ output signal, containing all phase information of the input signals.

o Schematics are located in the TM 10103A-23/5-1

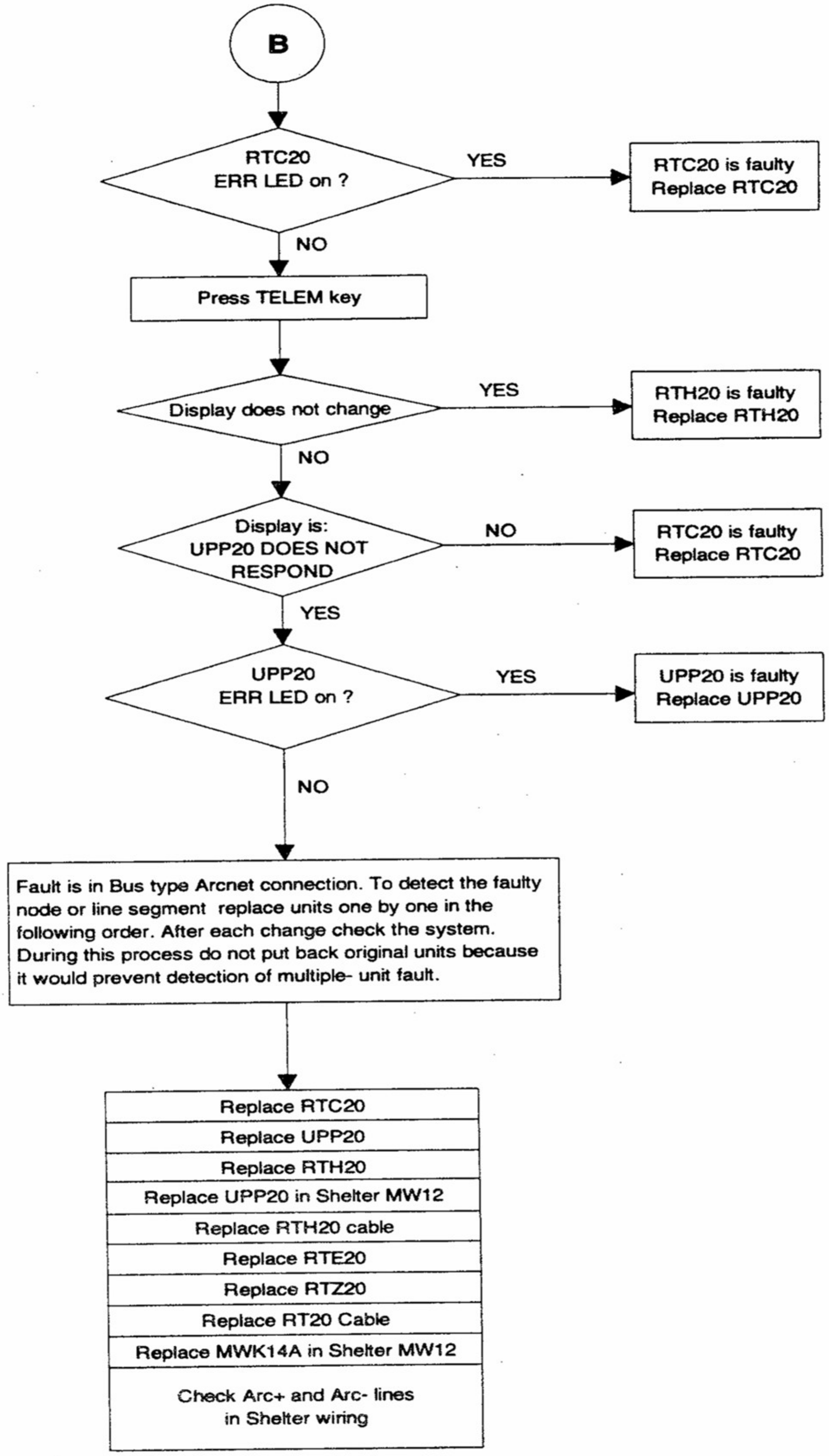
RDF troubleshooting flowchart


START
Install system according to test setup procedures.
Open the lid of RTE20.
Turn system power on.
RTP20 and RTP21 green LEDs on?
NO
A
YES
"RTC DOES NOT RESPOND" ON Hand Terminal's display?
YES
NO
Antenna rotation ok?
NO
C
YES
Telem. and tracking ok?
NO
D
YES
END

RDF troubleshooting flowchart


A
Is any LED on in elevation unit?
NO
Power feeding failure. Check system power supply. Replace: 1. RT20 cable, 2. Elevation unit, 3. Azimuth unit Check the system after each change.
YES
All RTP20 or RTP21 LED's are off?
YES
Faulty regulator or feeding voltage failure. Replace regulator.
RTP20 and RTP21 have some LED on?
NO
Feeding voltage failure. Check the power supply. If system is still unoperational, replace elevation unit
YES
NO
RTP20 and RTP21 have " I " LEDs on?
YES
System is in stand by state, or feeding voltage is out of tolerance. Check, that Stand By toggle switch is on.
RTP20 and RTP21 have " I " LEDs on?
YES
NO
NO
RTP20 or RTP21 have "IoL" LED on?
YES
Faulty plug-in unit or short circuit. Disconnect all plug-in units except RTP20 and RTP21.
RTP20 and RTP21 have only "OK" LEDs on?
NO
Faulty unit or short circuit Replace RTB cable.
YES
NO
Plug units in one at a time. Replace the unit which causes the red LED to light up.
"OK" LED off, when RTD is plugged in, and azimuth motor is rotated?
YES
Short circuit in azimuth brake Replace Azimuth unit
NO
YES
YES
Replace RTH cable.
NO
Only "OK" LEDs on?
Replace RTF30.
NO
Only "OK" LEDs on?
Only "OK" LEDs on?
NO
Replace RTH20
Only "OK" LEDs on?
NO
Short circuit. Replace elevation unit.
YES
YES
END

RDF troubleshooting flowchart

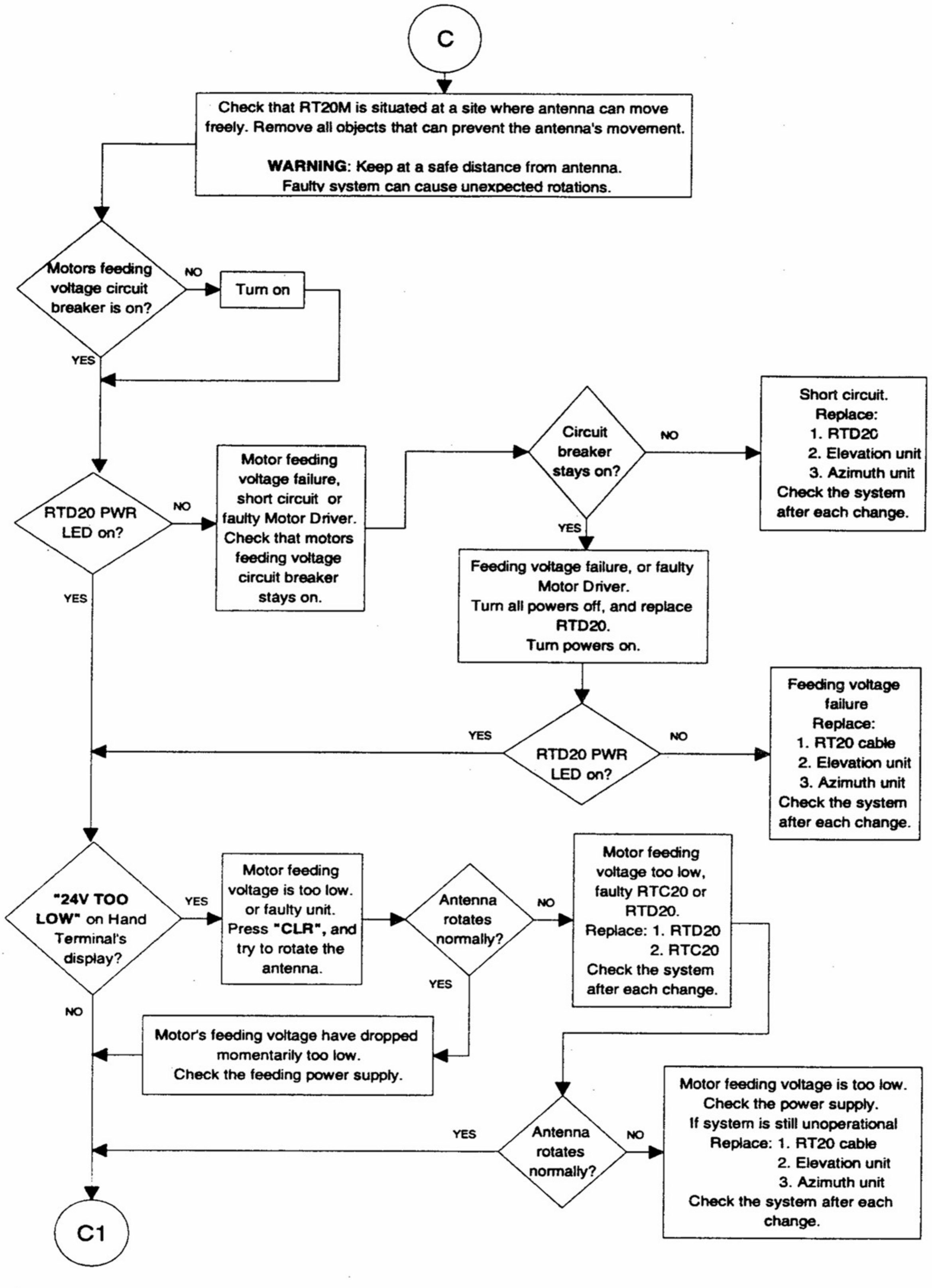


B
RTC20
ERR LED on ?
YES
RTC20 is faulty
Replace RTC20
NO
Press TELEM key
Display does not change
YES
RTH20 is faulty
Replace RTH20
NO
Display is:
UPP20 DOES NOT
RESPOND
NO
RTC20 is faulty
Replace RTC20
YES
UPP20
ERR LED on ?
YES
UPP20 is faulty
Replace UPP20
NO

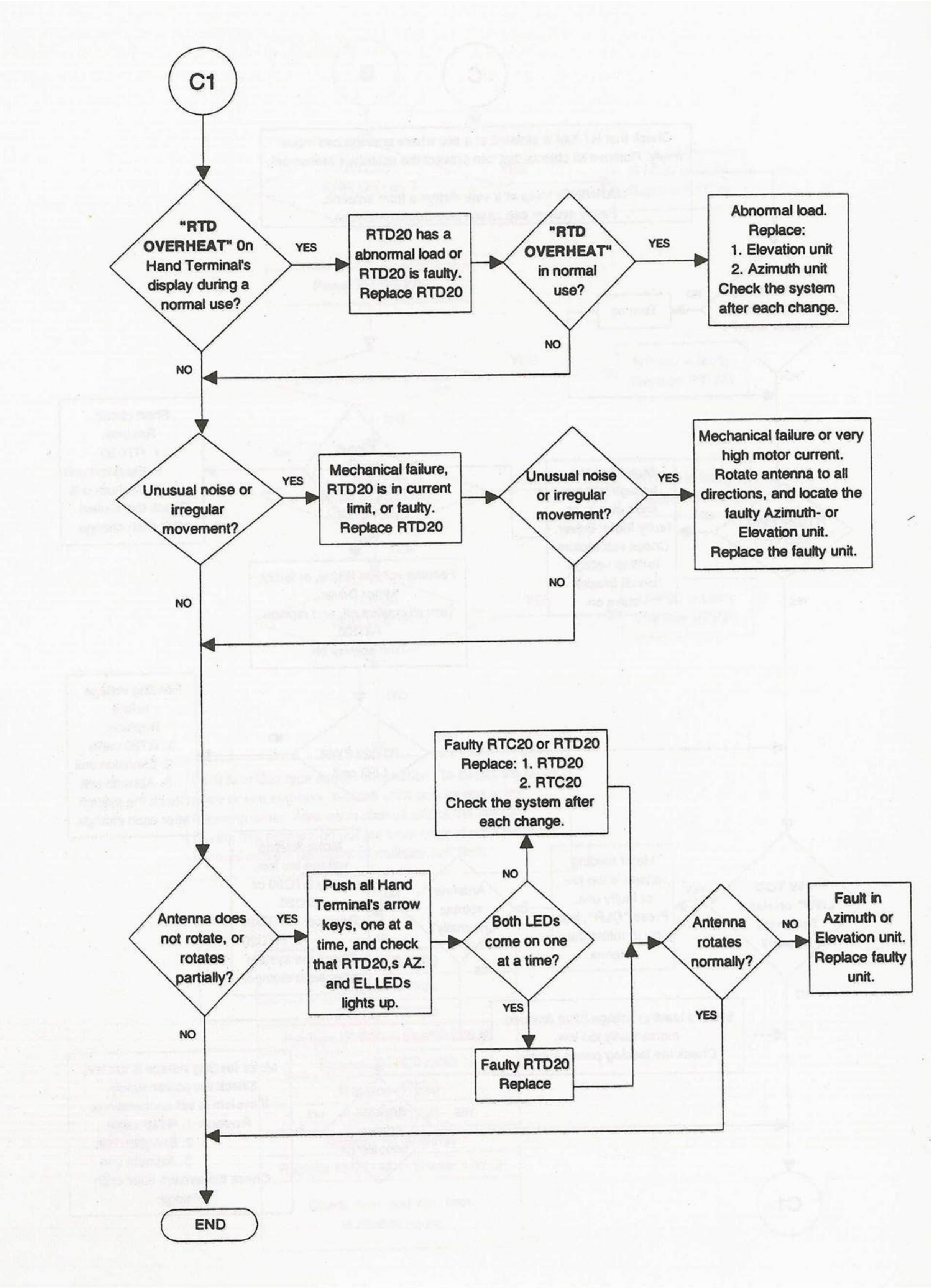
Fault is in Bus type Arcnet connection. To detect the faulty node or line segment replace units one by one in the following order. After each change check the system. During this process do not put back original units because it would prevent detection of multiple- unit fault.

- Replace RTC20
- Replace UPP20
- Replace RTH20
- Replace UPP20 in Shelter MW12
- Replace RTH20 cable
- Replace RTE20
- Replace RTZ20
- Replace RT20 Cable
- Replace MWK14A in Shelter MW12
- Check Arc+ and Arc- lines in Shelter wiring

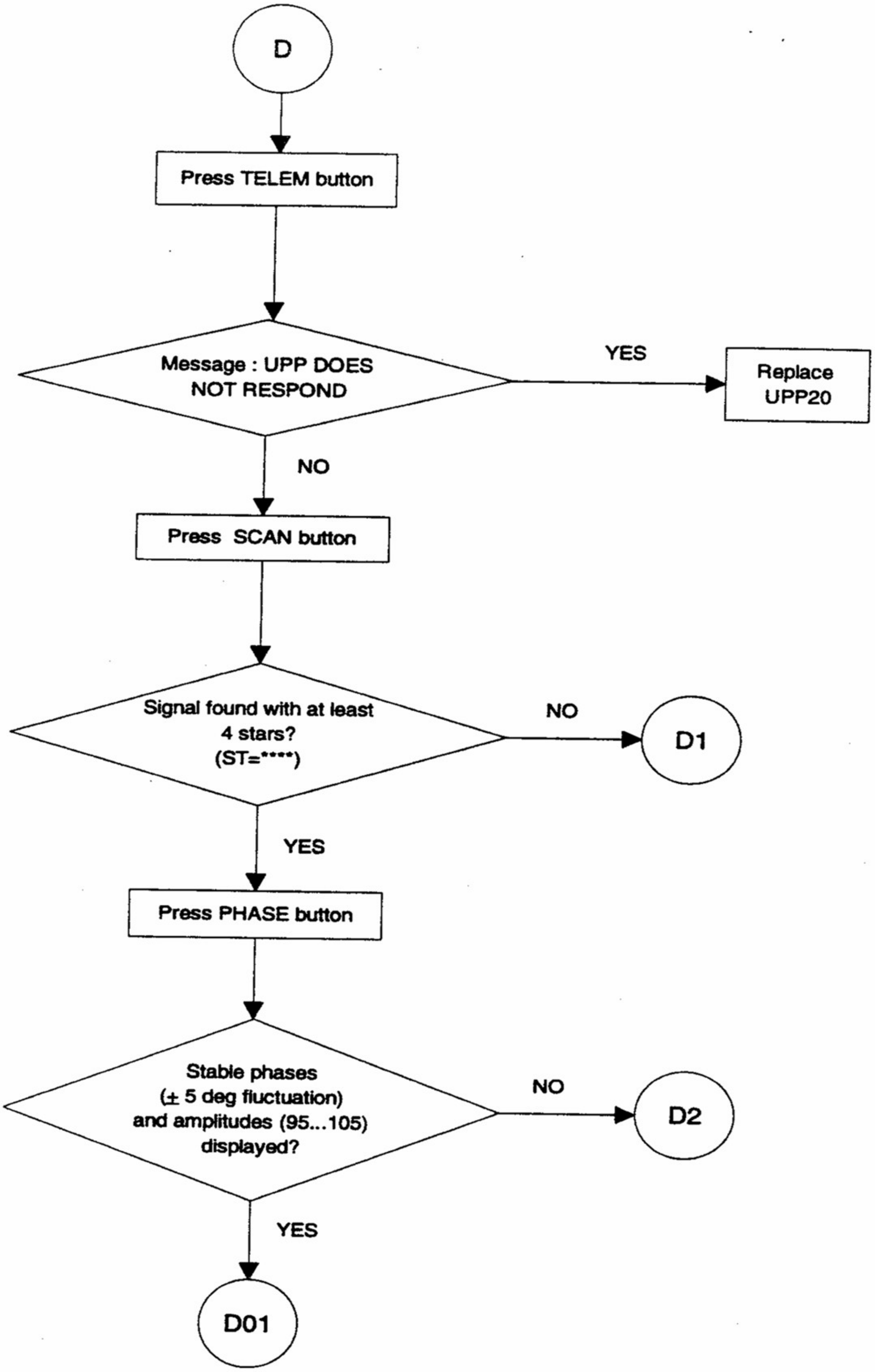
RDF troubleshooting flowchart


C
Check that RT20M is situated at a site where antenna can move freely. Remove all objects that can prevent the antenna's movement.
WARNING: Keep at a safe distance from antenna. Faulty system can cause unexpected rotations.
Motors feeding voltage circuit breaker is on?
NO
Turn on
YES
RTD20 PWR LED on?
NO
Motor feeding voltage failure, short circuit or faulty Motor Driver. Check that motors feeding voltage circuit breaker stays on.
Circuit breaker stays on?
NO
Short circuit. Replace: 1. RTD20 2. Elevation unit 3. Azimuth unit Check the system after each change.
YES
Feeding voltage failure, or faulty Motor Driver. Turn all powers off, and replace RTD20. Turn powers on.
YES
RTD20 PWR LED on?
YES
NO
Feeding voltage failure Replace: 1. RT20 cable 2. Elevation unit 3. Azimuth unit Check the system after each change.
"24V TOO LOW" on Hand Terminal's display?
YES
Motor feeding voltage is too low. or faulty unit. Press "CLR", and try to rotate the antenna.
Antenna rotates normally?
NO
Motor feeding voltage too low, faulty RTC20 or RTD20. Replace: 1. RTD20 2. RTC20 Check the system after each change.
YES
NO
Motor's feeding voltage have dropped momentarily too low. Check the feeding power supply.
YES
Antenna rotates normally?
NO
Motor feeding voltage is too low. Check the power supply. If system is still unoperational Replace: 1. RT20 cable 2. Elevation unit 3. Azimuth unit Check the system after each change.
C1

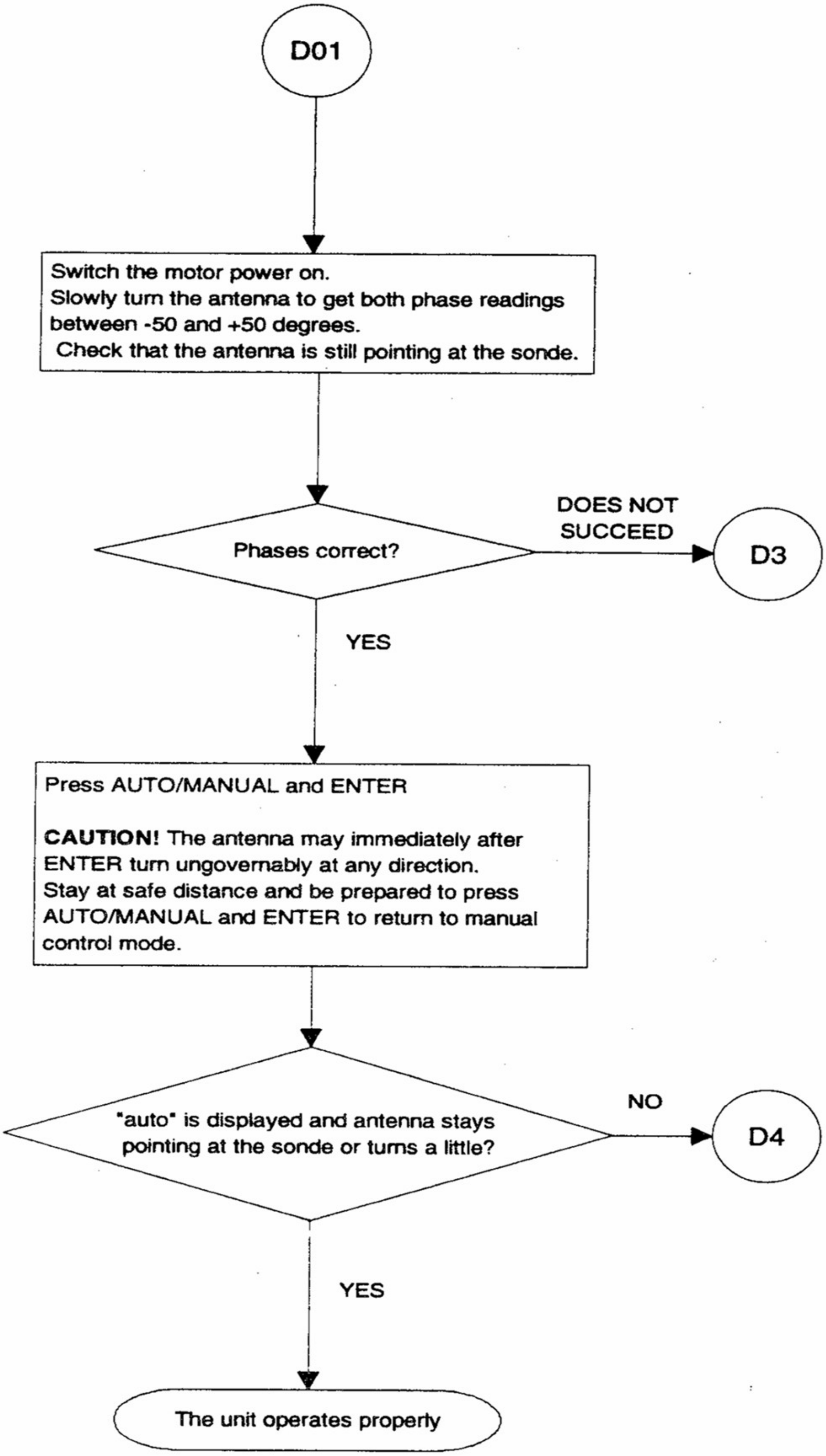
RDF troubleshooting flowchart


C1
"RTD OVERHEAT" 0n Hand Terminal's display during a normal use?
YES
RTD20 has a abnormal load or RTD20 is faulty. Replace RTD20
"RTD OVERHEAT" in normal use?
YES
Abnormal load. Replace: 1. Elevation unit 2. Azimuth unit Check the system after each change.
NO
NO
Unusual noise or irregular movement?
YES
Mechanical failure, RTD20 is in current limit, or faulty. Replace RTD20
Unusual noise or irregular movement?
YES
Mechanical failure or very high motor current. Rotate antenna to all directions, and locate the faulty Azimuth- or Elevation unit. Replace the faulty unit.
NO
NO
Antenna does not rotate, or rotates partially?
YES
Push all Hand Terminal's arrow keys, one at a time, and check that RTD20,s AZ. and EL.LEDs lights up.
Both LEDs come on one at a time?
NO
Faulty RTC20 or RTD20 Replace: 1. RTD20 2. RTC20 Check the system after each change.
YES
Faulty RTD20 Replace
Antenna rotates normally?
NO
Fault in Azimuth or Elevation unit. Replace faulty unit.
YES
NO
END

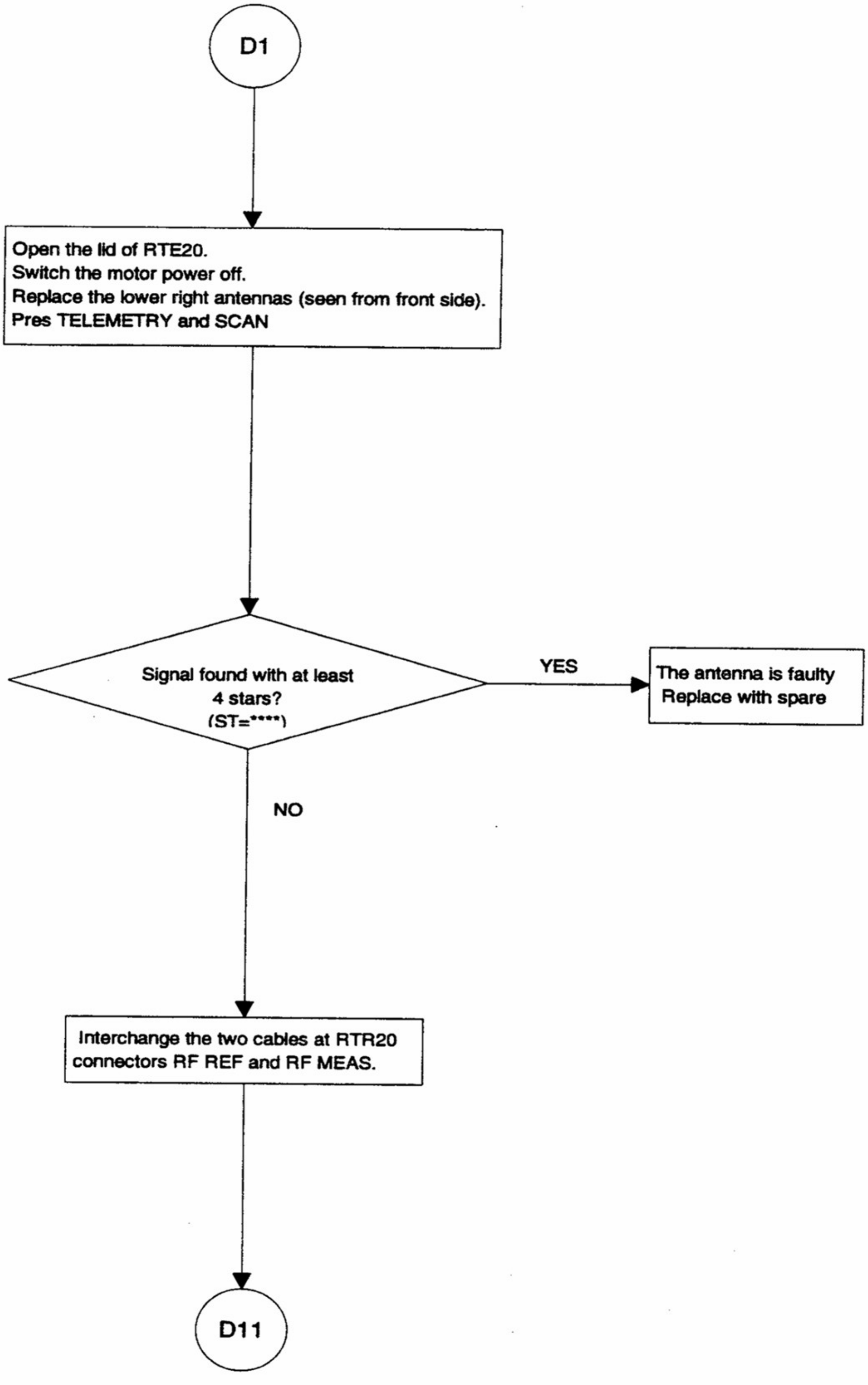
RDF troubleshooting flowchart


D
Press TELEM button
Message : UPP DOES NOT RESPOND
YES
Replace UPP20
NO
Press SCAN button
Signal found with at least 4 stars? (ST=****)
NO
D1
YES
Press PHASE button
Stable phases (± 5 deg fluctuation) and amplitudes (95...105) displayed?
NO
D2
YES
D01

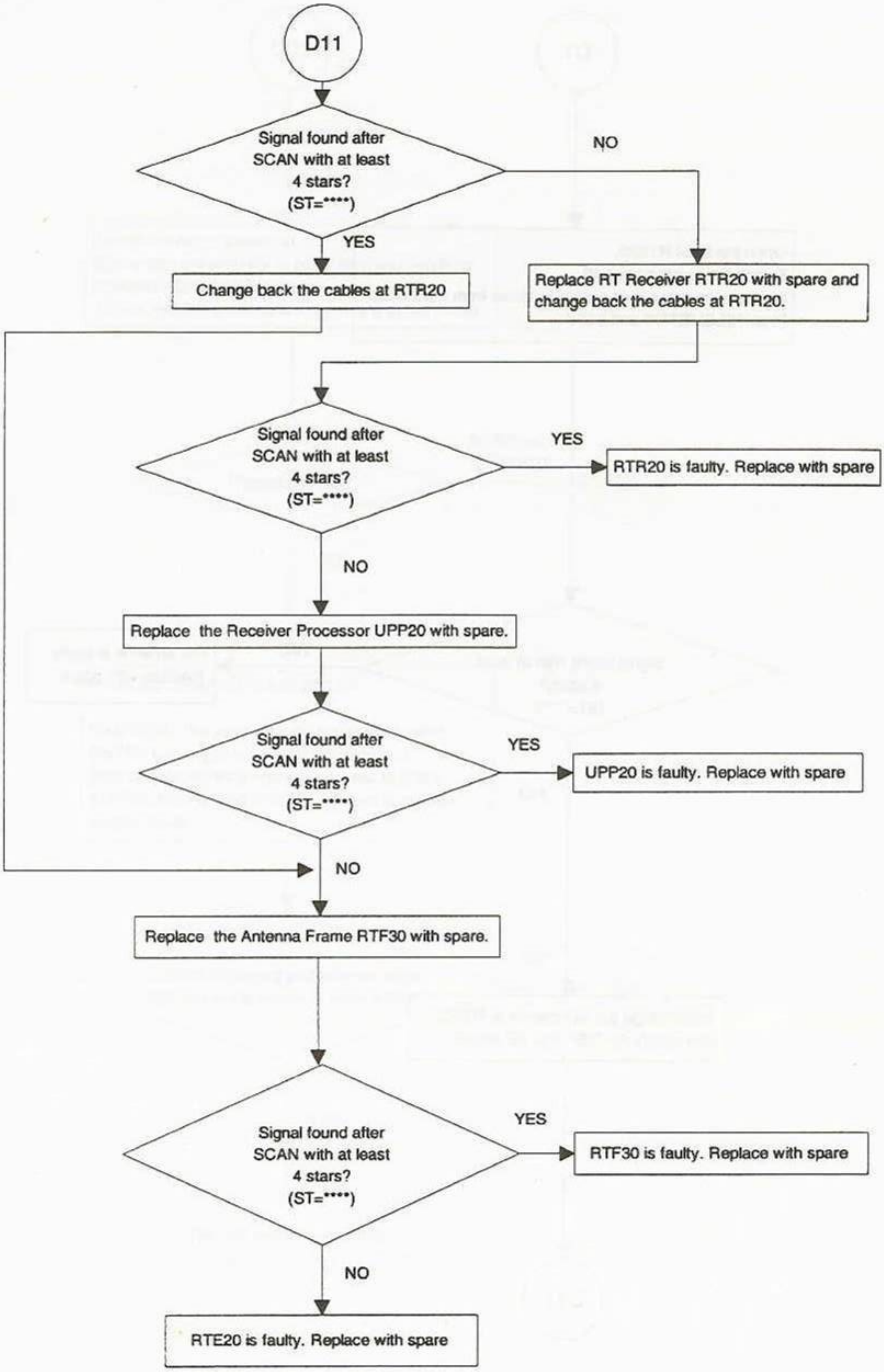
RDF troubleshooting flowchart


D01
Switch the motor power on.
Slowly turn the antenna to get both phase readings between -50 and +50 degrees.
Check that the antenna is still pointing at the sonde.
Phases correct?
DOES NOT SUCCEED
D3
YES
Press AUTO/MANUAL and ENTER
CAUTION! The antenna may immediately after ENTER turn ungovernably at any direction.
Stay at safe distance and be prepared to press AUTO/MANUAL and ENTER to return to manual control mode.
"auto" is displayed and antenna stays pointing at the sonde or turns a little?
NO
D4
YES
The unit operates properly

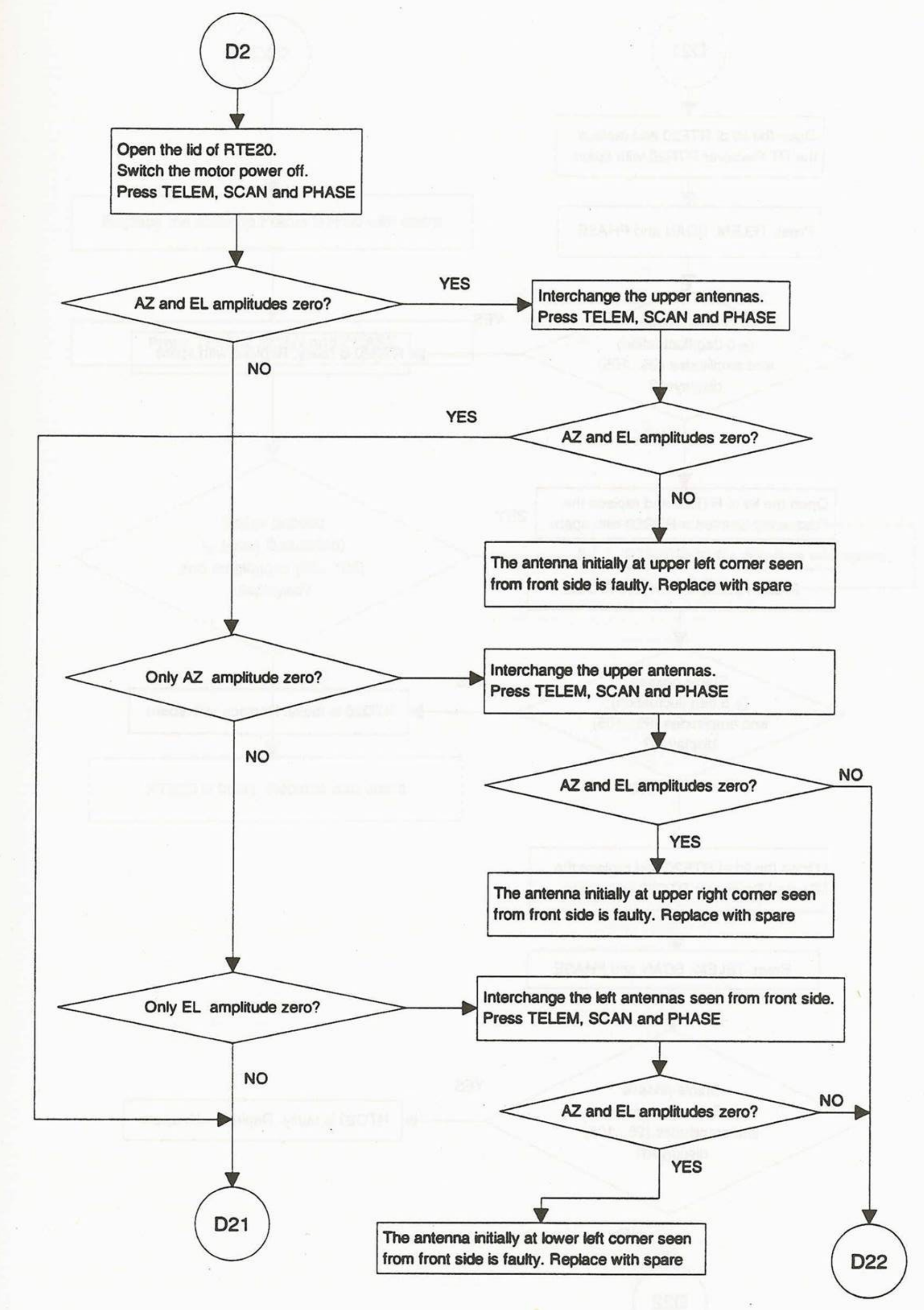
RDF troubleshooting flowchart


D1
Open the lid of RTE20.
Switch the motor power off.
Replace the lower right antennas (seen from front side).
Pres TELEMETRY and SCAN
Signal found with at least 4 stars? (ST=****)
YES
The antenna is faulty
Replace with spare
NO
Interchange the two cables at RTR20 connectors RF REF and RF MEAS.
D11

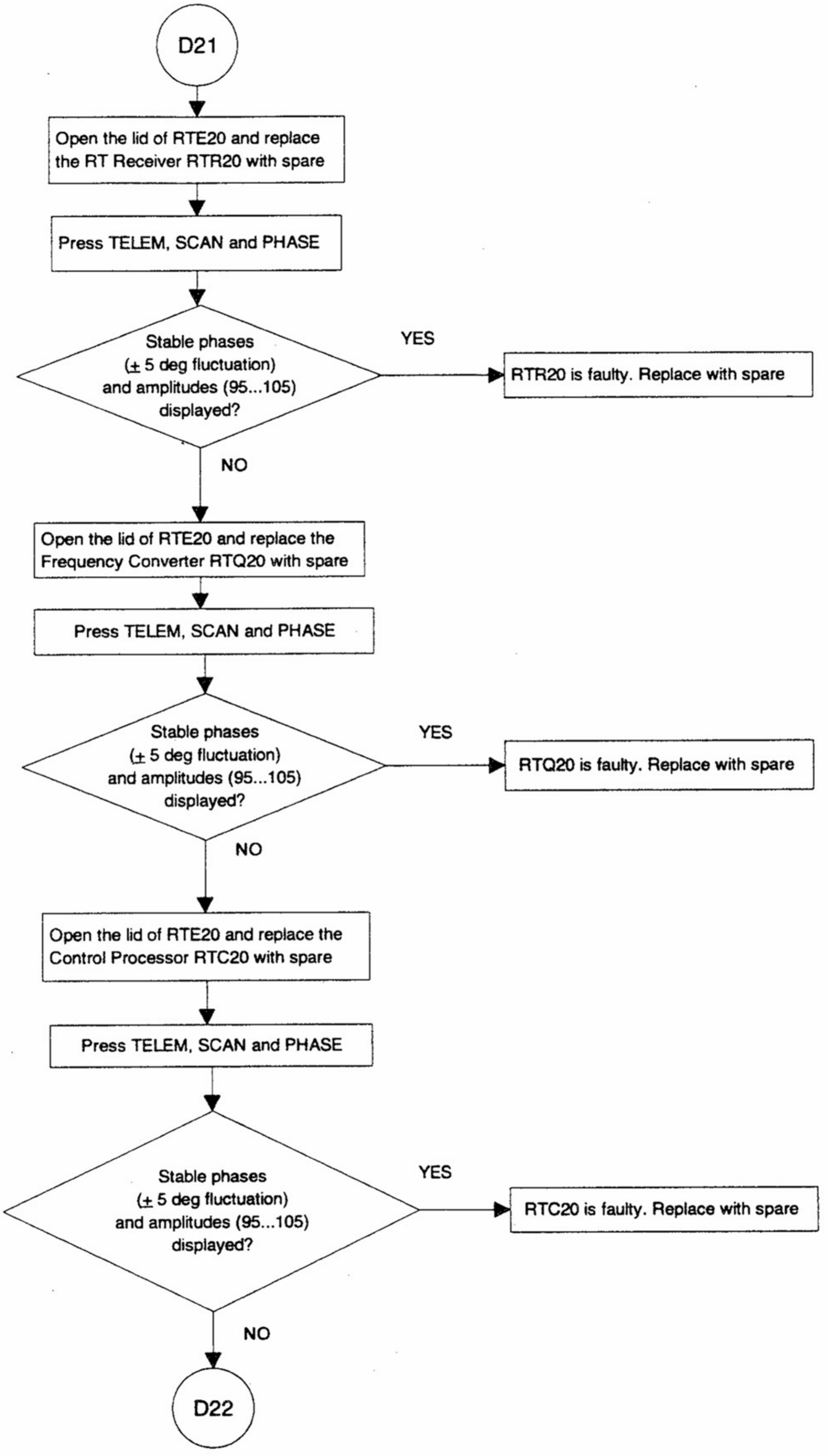
RDF troubleshooting flowchart


D11
Signal found after SCAN with at least 4 stars? (ST=****)
YES
NO
Change back the cables at RTR20
Replace RT Receiver RTR20 with spare and change back the cables at RTR20.
Signal found after SCAN with at least 4 stars? (ST=****)
YES
RTR20 is faulty. Replace with spare
NO
Replace the Receiver Processor UPP20 with spare.
Signal found after SCAN with at least 4 stars? (ST=****)
YES
UPP20 is faulty. Replace with spare
NO
Replace the Antenna Frame RTF30 with spare.
Signal found after SCAN with at least 4 stars? (ST=****)
YES
RTF30 is faulty. Replace with spare
NO
RTE20 is faulty. Replace with spare

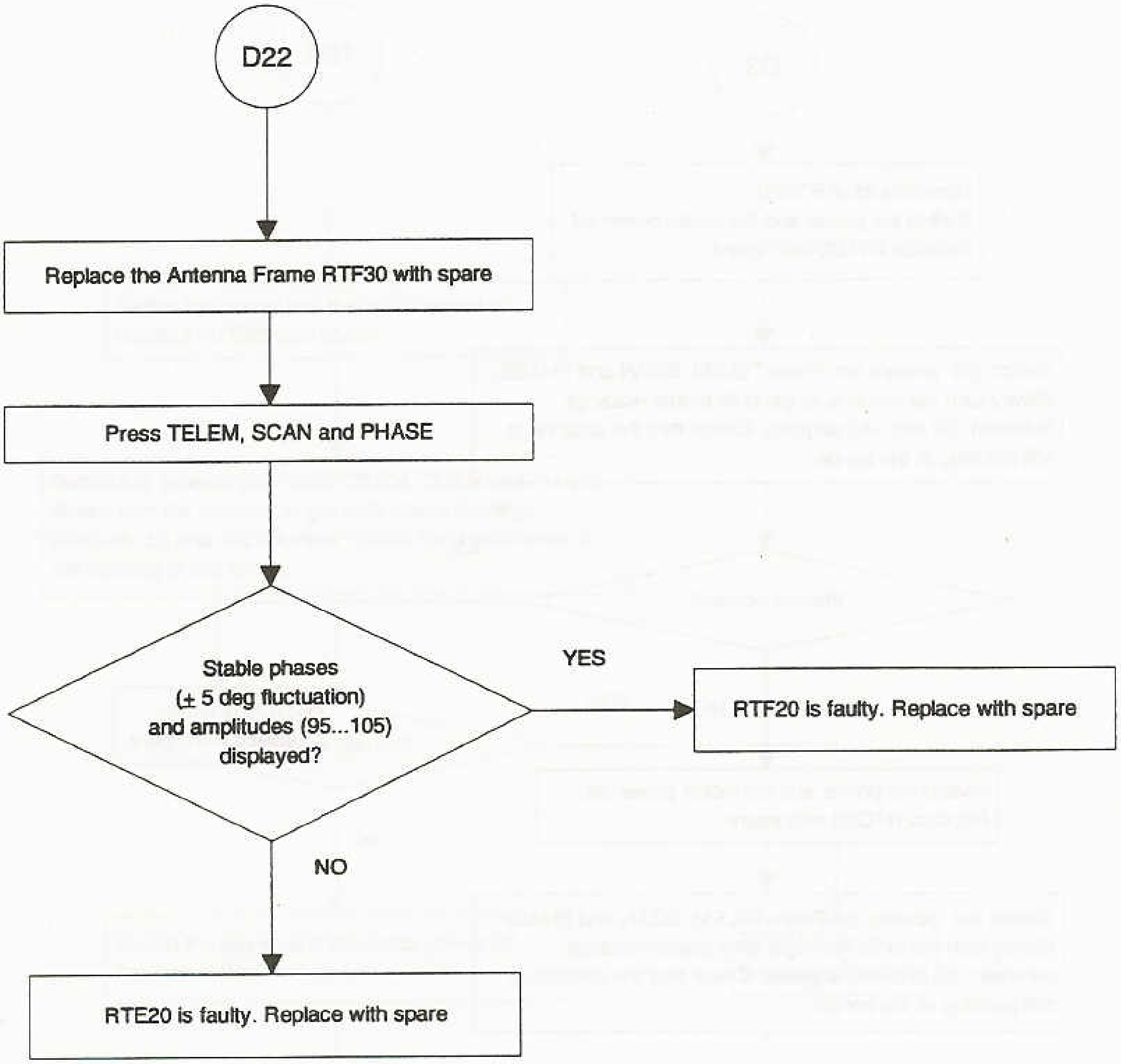
RDF troubleshooting flowchart


D2
Open the lid of RTE20.
Switch the motor power off.
Press TELEM, SCAN and PHASE
AZ and EL amplitudes zero?
YES
Interchange the upper antennas.
Press TELEM, SCAN and PHASE
NO
YES
AZ and EL amplitudes zero?
NO
The antenna initially at upper left corner seen from front side is faulty. Replace with spare
Only AZ amplitude zero?
Interchange the upper antennas.
Press TELEM, SCAN and PHASE
NO
AZ and EL amplitudes zero?
NO
YES
The antenna initially at upper right corner seen from front side is faulty. Replace with spare
Only EL amplitude zero?
Interchange the left antennas seen from front side.
Press TELEM, SCAN and PHASE
NO
AZ and EL amplitudes zero?
NO
YES
D21
The antenna initially at lower left corner seen from front side is faulty. Replace with spare
D22

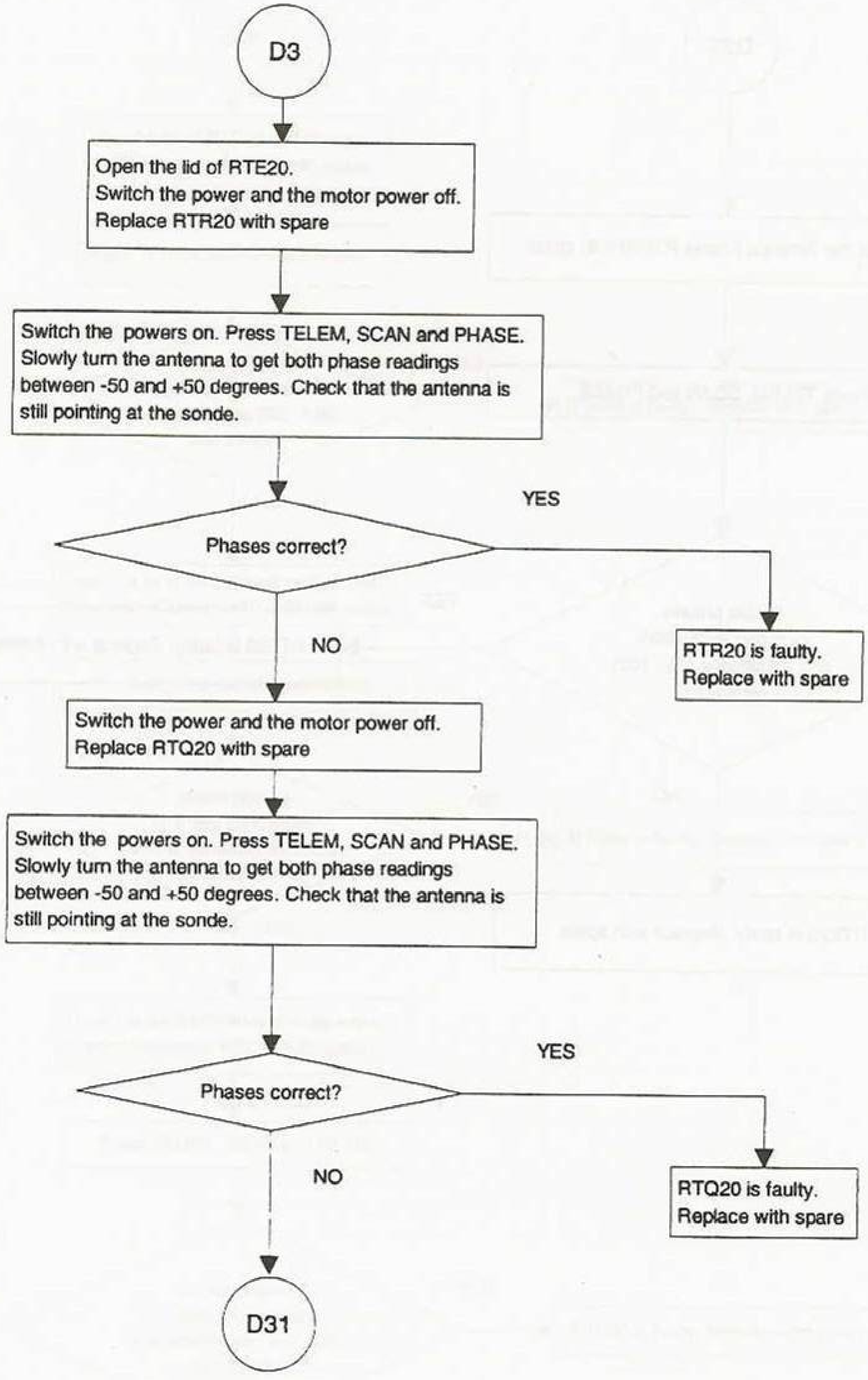
RDF troubleshooting flowchart


D21
Open the lid of RTE20 and replace the RT Receiver RTR20 with spare
Press TELEM, SCAN and PHASE
Stable phases (± 5 deg fluctuation) and amplitudes (95...105) displayed?
YES
RTR20 is faulty. Replace with spare
NO
Open the lid of RTE20 and replace the Frequency Converter RTQ20 with spare
Press TELEM, SCAN and PHASE
Stable phases (± 5 deg fluctuation) and amplitudes (95...105) displayed?
YES
RTQ20 is faulty. Replace with spare
NO
Open the lid of RTE20 and replace the Control Processor RTC20 with spare
Press TELEM, SCAN and PHASE
Stable phases (± 5 deg fluctuation) and amplitudes (95...105) displayed?
YES
RTC20 is faulty. Replace with spare
NO
D22

RDF troubleshooting flowchart


D22
Replace the Antenna Frame RTF30 with spare
Press TELEM, SCAN and PHASE
Stable phases (± 5 deg fluctuation) and amplitudes (95...105) displayed?
YES
RTF20 is faulty. Replace with spare
NO
RTE20 is faulty. Replace with spare

RDF troubleshooting flowchart



Open the lid of RTE20.
Switch the power and the motor power off.
Replace RTR20 with spare

Switch the powers on. Press TELEM, SCAN and PHASE. Slowly turn the antenna to get both phase readings between -50 and +50 degrees. Check that the antenna is still pointing at the sonde.

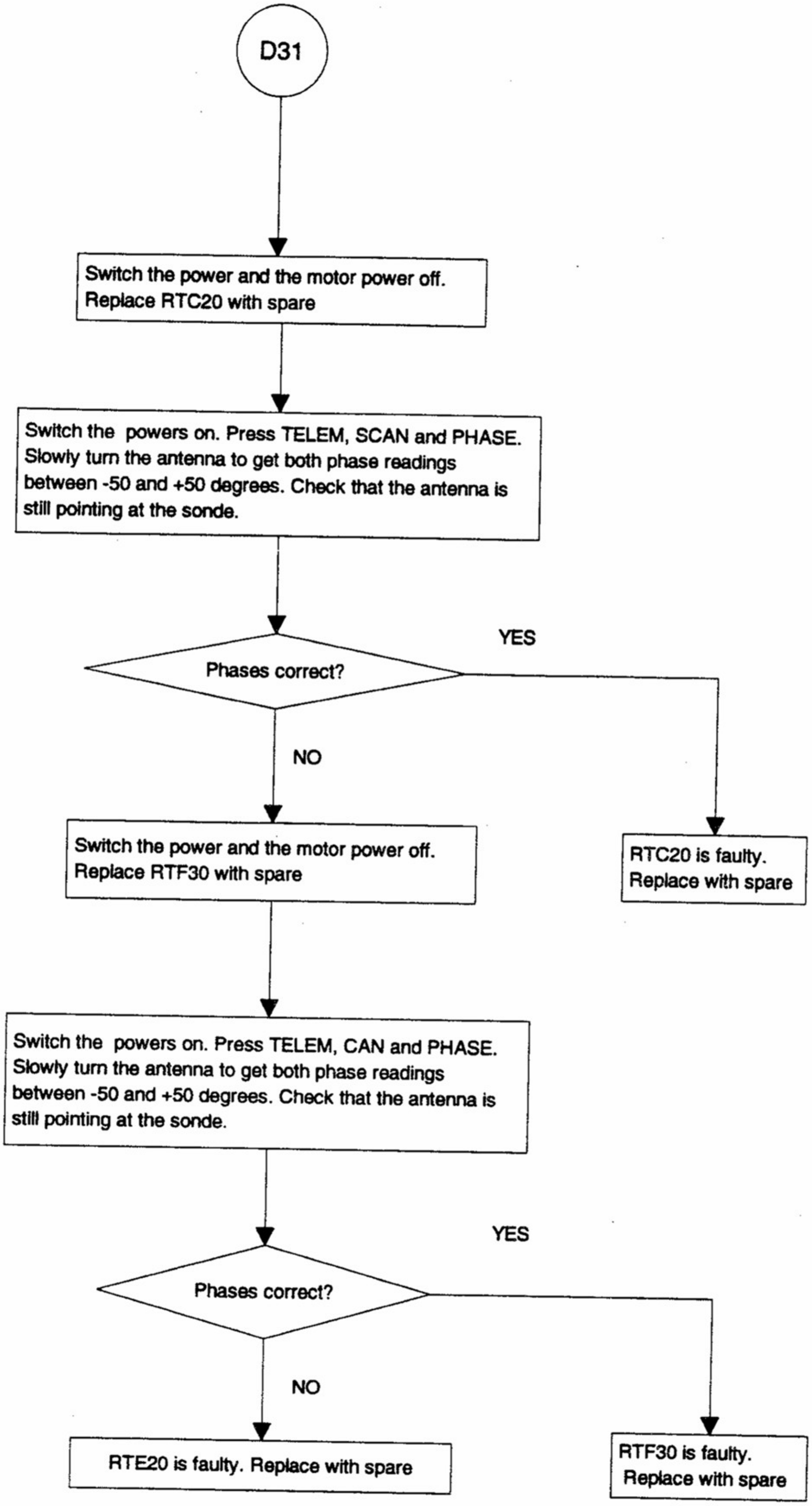
RTR20 is faulty.
Replace with spare

Switch the power and the motor power off.
Replace RTQ20 with spare

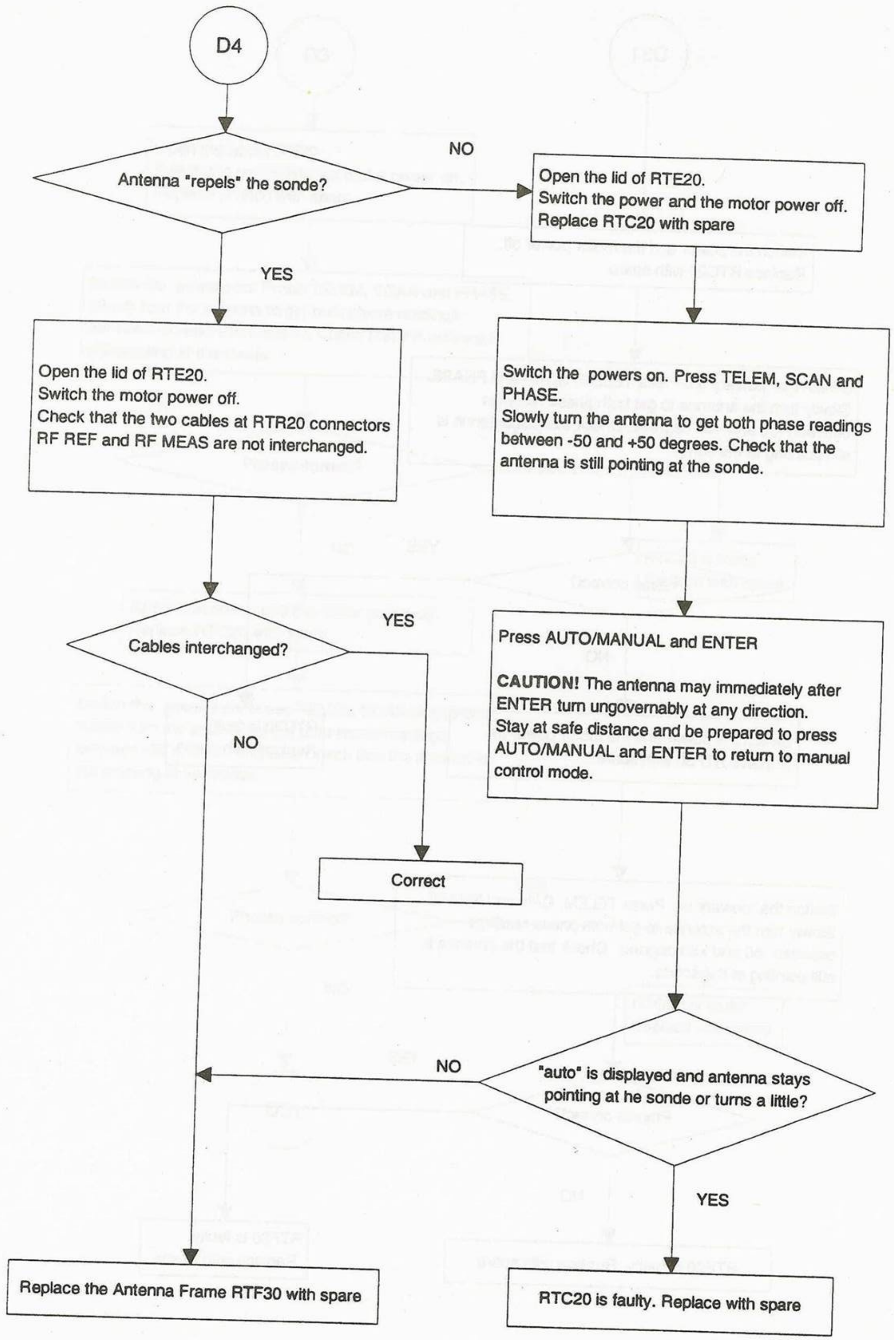
Switch the powers on. Press TELEM, SCAN and PHASE. Slowly turn the antenna to get both phase readings between -50 and +50 degrees. Check that the antenna is still pointing at the sonde.

RTQ20 is faulty.
Replace with spare

RDF troubleshooting flowchart


D31
Switch the power and the motor power off.
Replace RTC20 with spare
Switch the powers on. Press TELEM, SCAN and PHASE.
Slowly turn the antenna to get both phase readings
between -50 and +50 degrees. Check that the antenna is
still pointing at the sonde.
Phases correct?
YES
NO
RTC20 is faulty.
Replace with spare
Switch the power and the motor power off.
Replace RTF30 with spare
Switch the powers on. Press TELEM, CAN and PHASE.
Slowly turn the antenna to get both phase readings
between -50 and +50 degrees. Check that the antenna is
still pointing at the sonde.
Phases correct?
YES
NO
RTE20 is faulty. Replace with spare
RTF30 is faulty.
Replace with spare

RDF troubleshooting flowchart


D4
Antenna "repels" the sonde?
NO
YES
Open the lid of RTE20.
Switch the power and the motor power off.
Replace RTC20 with spare
Open the lid of RTE20.
Switch the motor power off.
Check that the two cables at RTR20 connectors RF REF and RF MEAS are not interchanged.
Switch the powers on. Press TELEM, SCAN and PHASE.
Slowly turn the antenna to get both phase readings between -50 and +50 degrees. Check that the antenna is still pointing at the sonde.
Cables interchanged?
YES
NO
Press AUTO/MANUAL and ENTER
CAUTION! The antenna may immediately after ENTER turn ungovernably at any direction.
Stay at safe distance and be prepared to press AUTO/MANUAL and ENTER to return to manual control mode.
Correct
"auto" is displayed and antenna stays pointing at he sonde or turns a little?
NO
YES
Replace the Antenna Frame RTF30 with spare
RTC20 is faulty. Replace with spare